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A U S T R A L I A.

CHAPTER I.

GEOGRAPHICAL DESCRIPTION OF AUSTRALIA.

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AUSTRALIA, considered as an island, is the largest in the world; viewed as a continent, it is the smallest. But both these terms are now commonly applied to the territory; and the original phrase of an island-continent appropriately expresses the relation it bears to other masses of land in point of magnitude. The proportions of the great divisions of the globe are roughly indicated by the following figures:—Asia 17, America 15, Africa 12, Europe 4, and Australia 3. The insular con-

continent lies between the parallels of $10^{\circ} 45'$ and $38^{\circ} 45'$ south, and the meridians of $112^{\circ} 20'$ and $153^{\circ} 30'$ east of Greenwich. The tropic of Capricorn divides it into two nearly equal parts. Between Cape York, the north extremity, and Wilson's Promontory, on the south, there are twenty-eight degrees of latitude, answering to upwards of 1,900 statute miles; following the parallel of 25° from Shark's Bay on the west, to Hervey Bay on the east, forty-one degrees of longitude are passed over, equal to 2,500 miles. If we suppose London to mark its eastern limit, a corresponding point for the western would have to be sought across the Atlantic, near the mouth of the St. Lawrence; or, if we suppose our metropolis to represent the northern extremity, the southern would have to be fixed in the heart of the African Sahara. But this vast extent is apt to mislead the imagination, unless distinctly checked by the statement that a very large proportion of the area is stamped with hopeless sterility, and can never be available for colonization.

Situated in the southern hemisphere, and comparatively near our direct antipodes, the days, nights, and seasons of the Australian year are opposite in their occurrence to our own. When the shades of midnight envelop the Thames, the morning sun, high in heaven, is lighting the shores of Port Jackson; and when ships are setting their chronometers at midday by the time ball at Greenwich, the

inhabitants of Sydney are retiring to their nightly rest. Our longest day coincides with their shortest, and the reverse. Their harvests are being reaped when the fields of northern Europe are clothed with snow, and its rivers choked with ice. The Christmas festival is their Midsummer. Oak branches and acorns take the place with them of our holly and misletoe; and while we celebrate the occasion with blazing fires to keep out the cold, they are perspiring from the heat in the densest shade. The spring months of Australia, referring to its settled districts, are September, October, and November; the summer, December, January, and February; the autumn, March, April, and May; and the winter, June, July, and August. Other phenomena are in direct opposition to our experience, and strikingly arrest the attention of the newly-arrived emigrant. The sun, which has a southerly position in the heavens to us, and deflects our shadows to the north when in the meridian, is northerly to our far away gold-seeking countrymen, their shadows falling to the south at noon. The north wind is hot, the south wind cold, and the east wind healthy and exhilarating. The leaves of the predominating trees, instead of being extended horizontally, are vertical. The native flowers are commonly without odour, the bees without sting, and the birds without melody. The owl hoots by day, the cuckoo coos by night. There are black swans, white eagles, with a

kind of mole which is semi-aquatic and lays eggs. These and other contrasts will be further noticed in due place. In the following general geographical outline, reference is principally made to the colonized parts of the country.

I. MARITIME FEATURES.

Two oceans wash the shores of Australia, the Pacific on the east, and the Indian on the west; their waters communicating by two channels on the north and south, which separate the territory from smaller insulated lands.

Bass's Strait, the southern channel, divides the colony of Victoria from Tasmania, or Van Diemen's Land, and is the great oceanic highway of shipping between Sydney and the mother country. The strait is rather more than a hundred miles wide between the nearest points of the main shores, Wilson's Promontory and Circular Head. Chains of islands, rocky and barren, run across it at the eastern and western entrances, some of which are extensive, as Flinder's Island, which has a circuit of about one hundred and thirty miles. They rise also to some elevation, and form connecting links between the Australian and Tasmanian highlands.

HEIGHTS IN BASS'S STRAIT.

	<i>Feet.</i>
Rotundo, nearest point to Wilson's Promontory	1,130
Curtis Island	1,160
Sugar Loaf	1,410
Strzelecki's Peak, Flinder's Island	2,550
Mount Munro , ...	2,300

The passage between the limits named is thickly studded with islets, shoals, and coral reefs, which, with violent prevailing westerly winds, render careful navigation necessary. But, owing to recent nautical surveys and light-houses, ordinary precaution is only required to avoid the accidents that were formerly common in the strait. No aborigines were found on any of the islands when first visited by Mr. Bass; but he had to fight his way through seals and albatrosses in effecting a landing. The birds, unaware of the power of the visitor, sat quietly upon their nests, only disturbing their dignity so far as to peck at the legs of the intruder as he passed. In process of time, sailors employed in sealing took up their abode in the scenes of their labour, and adopted a Robinson Crusoe kind of life, contracting barbarous habits. Escaped convicts also found their way to the islands; and native women being kidnapped from the main land, a half caste population sprang up. These settlers are now divided into eastern and western Straitsmen, according to their locality. Preservation Island, a rocky piece of land, two miles long by half-a-mile broad, was inhabited in 1842, by an old sealer of the name of James Munro, who had occupied the desolate place for upwards of twenty-three years, and was generally known as the king of the eastern Straitsmen. Another man and three or four native women completed the settlement, if such a term may be applied. They lived in a few

rude huts on a bleak flat, with scarcely a tree near, but sheltered from the west by low granite hills. A number of dogs, goats, and fowls constituted their live stock. As the seals have become rare, through thoughtless destruction in the breeding season, fowling is now the principal occupation of the Straitsmen. Yet the birds, albatrosses, petrels, and penguins, continue to maintain themselves in their old haunts in vast swarms, notwithstanding an annual wholesale carnage for their feathers and oil.

Torres Strait, the northern channel, about ninety miles wide, separates the main land in that direction from New Guinea. It affords the nearest route from Sydney to Singapore, India, and China. Though much frequented, the navigation is so intricate and critical, that the circuitous course round the entire south and west of Australia is commonly preferred. On its eastern side, the strait is nearly choked with islands, some volcanic and granitic, but the great majority consisting of coralline formations. The latter are nearly all flat low islets, rising not more than twenty or thirty feet above high-water mark. Booby Island, a mass of dark-coloured porphyry, so called from its flocks of stupid gannets, marks the western limit of danger in this archipelago. It bears also the name of the "Post Office," having a shed provided with pens, ink, and a blank book, in which ships, outward bound from Sydney, register their safe arrival, and homeward vessels convey the intelligence.

Letters also can be left and conveyed in the same manner. A stock of biscuit and salt beef is kept for the relief of any shipwrecked crew. The water being everywhere comparatively shallow, with a white sandy or rocky bottom, its living forms are brought into distinct view to a spectator on shipboard, by the vivid sun of the tropics—subaqueous vegetation of various kinds—sponges, sea-eggs, and differently coloured molluscs—turtles moving along in their cumbrous shells—sharks roaming in search of prey—and huge variegated sea-shakes gliding to and fro.

From the neighbourhood of Torres Strait, there extends along the north-east coast of Australia a linear series of coral reefs, known collectively as the Great Barrier Reef, from acting as a buttress to the shore against the roll of the Pacific Ocean. This is the grandest specimen of the kind on the face of the globe, and as striking an example as can be found of minute individual parts forming by combination a magnificent result. The reef stretches from Breaksea Spit on the south, to the vicinity of New Guinea on the north, or about 1,200 statute miles. It rises on the outside perpendicularly from unfathomable depths, fluctuates considerably in its width, from thirty or forty miles to less than one, and in places approaches and recedes from the coast, averaging the distance of about thirty miles from it. With the wind blowing from the east, the arm of the sea inside the reef is tranquil, being protected by the natural breakwater, but on the outside the

waves dash with tremendous fury against it. Mr. Jukes, the naturalist to the expedition under captain Blackwood, for facilitating the navigation of these waters, thus describes the exterior scene: "The long ocean-swell, being suddenly impeded by this barrier, lifted itself in one great continuous ridge of deep blue water, which, curling over, fell on the edge of the reef in an unbroken cataract of dazzling white foam. Each line of breakers runs often one or two miles in length, with not a perceptible gap in its continuity. There was a simple grandeur and display of power and beauty in this scene that rose even to sublimity. The unbroken roar of the surf, with its regular pulsation of thunder, as each succeeding swell fell first on the outer edge of the reef, was almost deafening, yet so deep-toned as not to interfere with the slightest nearer or sharper sound. . . . Both the sound and sight were such as to impress the spectator with the consciousness of standing in the presence of an overwhelming majesty and power." There are a few openings by which ships pass through the Great Barrier, and several intricate boat channels. At the best passage, a circular stone tower has been erected on a small islet, as a beacon to guide the mariner; and a garden attached to it is planted with cocoa-nuts, maize, pumpkins, and vegetables.

The coast-line of Australia has been computed at somewhat less than 8,000 miles. Its most considerable indentation, the Gulf of Car-

pentaria, on the north, penetrates 600 miles inland, and has almost invariably a low shore, of an extremely uninviting character. Nearly opposite, on the south, and of an opposite aspect, the great Australian bight presents its vast concavity, as if scooped out by the swell of the Indian Ocean, to which it is exposed. It is remarkable for an unbroken line of singularly barren and horizontally stratified cliffs, extending round the head of the bight, through a distance of about 600 miles. The height varies from 300 to 500 feet, and, from the summit, the country stretches away into the interior in apparently boundless plains. This long uniform barrier is probably without example. Among the headlands, prominent on account of their position or appearance, Cape York, the north point, is marked by a sharply-peaked porphyritic hill, about the height of our St. Paul's ; Cape Capricorn, on the east coast, a rounded mass like the hump of a dromedary, derives its name from lying under the line of the southern tropic ; Cape Howe, the south-east extremity, is a low track of rock and sand, now indicated at night by a lighthouse on an adjacent island ; Cape Leeuwin, (Lioness, the name of a Dutch ship,) at the south-west corner, is a smooth and tolerably elevated rise, notorious for the heavy seas and strong south-westerners with which it is visited ; and Wilson's Promontory, the extreme southern projection, is an enormous mass of granite, towering to the height of 3,000 feet, commonly enveloped in

clouds of mist, but in clear weather commanding a magnificent view of Bass's Strait.

II. MOUNTAINS AND PLAINS.

The principal highlands of Australia, as far as at present known, are situated near the coast, and run, for the most part, parallel to it, sending off lateral spurs to its borders, and towards the interior. It was formerly supposed that this belt was continuous along the entire shore, the country declining from it inland to a vast unknown sea or lake. But this opinion has been proved to be erroneous by the progress of discovery. At various points the shore consists of a series of low, flat table-lands, or sandy downs, stretching away into the interior, apparently to an indefinite extent. But in other parts, the maritime lands are occupied with mountain ranges, the most continuous, important, and best known of which are on the eastern coast. A chain of heights traverses its entire length, and is prolonged by rocky islands into New Guinea on the north, and Van Diemen's Land on the south. It is nowhere a single ridge, nor of uniform character, but composed of several ranges, exhibiting peaked, serrated, and rounded masses. It includes also great table-lands, which are furrowed with precipitous gulleys, and often terminate on the seaward side in nearly perpendicular escarpments. These highlands, to the back of Sydney, are known as the Blue Mountains, and, further south, as the Australian Alps. But

they are not of Alpine elevation, though the snow lies on many of the summits through the greater part of the year, and is permanent on the loftiest. The highest point, Mount Kosciuszko, on the southern frontier of New South Wales, raises its sienitic cone 6,500 feet, commands a view of 7,000 square miles, and furnishes a perpetual supply of water to the Murray River from its melting snows. Strzelecki, who ascended it, thus describes the scene: "Standing above the adjacent mountains, which could either detract from its imposing aspect, or intercept the view, Mount Kosciuszko is one of those few elevations, the ascent of which, far from disappointing, presents the traveller with all that can remunerate fatigue. In the north-eastward view, the eye is carried as far back as the Shoalhaven country, the ridges of all the spurs of Maneiro and Twofold Bay, as well as those which, to the westward, enclose the tributaries of the Murrumbidgee, being conspicuously delineated. Beneath the feet, looking from the very verge of the cone downwards, almost perpendicularly, the eye plunges into a fearful gorge of 3,000 feet, in the bed of which the sources of the Murray gather their contents, and roll their united waters to the west."

Solitary, narrow, and profoundly deep defiles are prominent features of this coast chain, and render the examination of it a task of immense difficulty. These stupendous rents in the bosom of the earth, enclosed between gigantic

walls of sandstone rock, which often frightfully overhang them, are the beds of foaming torrents after heavy rains. Mr. Dixon, the surveyor, who first penetrated the gorge of the Grose River, got entangled in the ravines, was bewildered four days, and thanked God, to use his own words, when he at length found his way out of them. Vast and immensely deep valleys, bounded by precipitous cliffs, and only accessible through a narrow opening at one extremity, are still more remarkable formations. They naturally suggest the inquiry, to which no plausible answer can be returned, what can have become of the matter scooped out? These gulfs or bays of the earth are generally clothed with timber; but the tops of lofty trees, many hundred feet below the spectator, standing on the boundary walls, appear like brushwood. That attentive observer of nature, Mr. Darwin, thus records his impressions of one of these localities: "In the middle of the day we baited our horses at a little inn called the 'Weather-board.' The country here is elevated 2,800 feet above the sea. About a mile and a half from this place there is a view exceedingly well worth visiting. By following down a little valley and its tiny rill of water, an immense gulf is unexpectedly seen through the trees which border the pathway, at the depth of, perhaps, 1,500 feet. Walking on a few yards, one stands on the brink of a vast precipice, and below is the grand bay or gulf, (for I know not what other name to give it,) thickly covered

with forest. The point of view is situated as if at the head of a bay, the line of cliff diverging on each side, and showing headland behind headland, as on a bold sea-coast. These cliffs are composed of horizontal strata of whitish sandstone, and so absolutely vertical are they, that in many places a person standing on the edge, and throwing down a stone, can see it strike the trees in the abyss below ; so unbroken is the line, that it is said, in order to reach the foot of the waterfall, formed by this little stream, it is necessary to go a distance of sixteen miles round. About five miles distant in front, another line of cliff extends, which thus appears completely to encircle the valley, and hence the name of bay is justified as applied to this grand amphitheatrical depression. If we imagine a winding harbour, with its deep water, surrounded by bold, cliff-like shores, laid dry, and a forest sprung up on its sandy bottom, we should then have the appearance and structure here exhibited. This kind of view was to me quite novel, and extremely magnificent." The Weatherboard Hut inn is on the high road from Sydney to the gold-fields of Bathurst. The valley was named by governor Macquarie, Prince Regent's Glen, and the waterfall, the Campbell Cataract. Though ordinarily insignificant, it becomes a fine object when great rains have swollen the rill into a torrent.

In the geological structure of the mountains, granite, with its varieties, is frequently deve-

loped at the surface, and seems to form the great axis of the chain. Quartz, clay-slate, and other schistose rocks, appear prominent in the central and western ranges, gradually declining towards the interior. A vast palæozoic formation predominates on the eastern side, and occupies the surface to the coast. It consists of thick masses of variegated sandstone, interstratified at intervals with beds of shale and limestone belonging to the carboniferous system. But this formation, along with the schists, has been extensively dislocated and cut through by the eruption of masses of porphyry greenstone, basalt, and other igneous rocks. The carboniferous limestone presents the same perforated aspect which has won for it the name of the cavern-limestone in Europe and our own country. Sir Thomas Mitchell examined some caves in the cliffs of Wellington Valley, about two hundred miles to the west of Sydney, containing depositions of lime in the form of stalactites or stalagmites, with fossil bones of animals, either extinct, or not yet met with living in the country. But the grandest example of an excavation is on the Burran-Gibona creek, in the district of Bathurst. This is a natural tunnel, formed through a mass of rock, by which the waters of the creek effect their disengagement from a glen. The entrances have a span of more than a hundred feet; the arches rise upwards of fifty feet; the whole length amounts to above seven hundred feet; and the roof is fretted and festooned with white, yellow,

green, and pale pink stalactites, exhibiting the most fantastic shapes.

No active volcanic mountains have been discovered in Australia, and the terrible phenomena of earthquake shocks are not known to colonial experience. But evidence of extinct volcanic action appears in various parts of the country in true crateriform hills and veritable lavas. Distinctly marked craters and hills of lava are found in Victoria, near the celebrated "diggings" of Ballarat and Mount Alexander. It is remarkable, that along the whole extent of the eastern coast, from Bass's to Torres Straits, pebbles of pumice are strewn. This volcanic product is found on the flats immediately behind the beaches, a few feet above high-water mark; the pebbles are always rounded, and are met with frequently in considerable abundance; but they have never been seen floating upon the adjacent waters, nor upon the actual beach, as if washed up by the sea. In accounting for their presence, it has been conjectured that they have been produced by some great eruption of the volcanoes of New Zealand or New Guinea, and have been borne to their present place above high-water mark by one of those extraordinary waves consequent on the earthquakes which frequently occur in connexion with volcanic violence. The curious spectacle of a hill in actual combustion has been observed in a low range near the sources of Hunter's River. From the name applied by the aborigines to the spot, which it

still bears, Mount Wingen, signifying "fire," it may be inferred that the process of ignition is not of very recent origin. The hill, composed chiefly of sandstone rock, was first noticed to be internally on fire in the year 1818, and carefully examined in 1830-31, at which time upwards of two acres of the area were affected. Columns of sulphureous and steaming vapour came from rents and fissures, accompanied by brilliant flame. On looking down into the apertures to the depth of about fifteen feet, the sides of the rock were perceived to be of a white heat, like that of a lime-kiln. The margins of the clefts exhibited efflorescent crystals of sulphur, varying in colour from the deepest orange, occasioned by ferruginous admixture, to the palest straw, where alum predominated. A kind of bitumen, black, tarry, and lustrous, also abounded on the edges of some of the chasms. The burning hill of Wingen is a parallel phenomenon to the combustion at Holworth, in the neighbourhood of Weymouth, in our own country, where the bituminous shale has been ignited, probably by rain-water acting on iron pyrites.

The region of the plains is of a very varying character. On the western or landward side of the great eastern coast chain, are vast upland plains of undulating aspect, gradually declining into perfect levels towards the interior. Many of these tracts assume the form of downs; they present a series of detached, gentle, and round-topped protuberances, devoid of timber, but

broken at intervals by woody ranges. In the flats between the more elevated grounds are deep ponds, filled by streams from the highlands, ordinarily supporting an almost inexhaustible range of cattle pasture at all seasons of the year. The grasses and herbage exhibit an extraordinary luxuriance of growth; the higher lands also are grassy, and being convenient to water, they form valuable and safe pastures for sheep, perfectly beyond the reach of those floods which take place on the flats in the rainy season. Such are the Bathurst and Darling downs, the Liverpool, Canning, and Peel plains, great grazing grounds of New South Wales. In other districts, the pastures are thinly timbered, with three or four trees to the acre, and the country has the aspect of an English park, groves alternating with open lawns. By the margin of rivers, and on the alluvial soil visited by their inundations, the surface is clothed with dense forests of gigantic gum trees, intermingled with cedar, rosewood, wild vines, and various parasitical plants, forming the "thick brush," or jungle, of colonial speech. In dry and sterile situations, as on rocky or sandy plains, there is often still a forest, but of stunted miserable-looking trees, to which the colonial term of "scrub" is applied, inhabited by the black snake and the lizard. The central regions consist of vast levels, as truly desert as any on the face of the globe.

III. RIVERS AND LAKES.

The country is essentially defective in its irrigation. There are some important rivers, with numerous minor streams, but none are of magnitude proportionate to the vast range of the territory, or comparable to the great drainage systems of other regions either as to the length of their course, volume of waters, or capacity for navigation. There are also many lagoons along the coast, and interior lakes, both fresh and salt ; but the entire water supply is largely subject to a prime natural drawback, existing, as it does, only for a brief period of redundancy, alternating with a longer interval of deficiency or absolute failure. The seaboard of New South Wales is traversed by rivers, which descend to the ocean from the eastern coast-chain, on the flanks of which they are formed by the junction of mountain streams and torrents. Their course is necessarily limited, owing to the contiguity of the mountains to the shore. But by way of compensation, instead of passing direct to the sea, from west to east, they run for a considerable extent in the line of the range, north and south, adding to their length by this discursive flow, and increasing their own value.

Thus, the Hawkesbury, at Windsor, a town on its banks, is not more than thirty-five miles in a direct line from Broken Bay, where it disembogues, but runs over a distance of one hundred and forty miles in making the passage

owing to its circuitous route. The streams which descend the western side of the mountains, or towards the interior, diminish as they flow, or are finally absorbed by the thirsty soil, except the Murray and its tributaries. It may here be remarked, that by a somewhat absurd nomenclature, small inland water-courses, the beds of temporary torrents, completely dry some parts of the year, are commonly dignified with the name of "creeks" in Australia—a term which we apply exclusively to branches of the sea—while vast inlets of the ocean are sometimes styled rivers. The Paramatta river is an oceanic channel, the head of Port Jackson, with perfectly salt water.

The Murray is the largest river of Australia. A detailed notice of it may be conveniently given in this place, as it does not belong to any single colony, but forms the boundary between New South Wales and Victoria, while its lower course and entrance into the ocean lie within the limits of South Australia. It is thus the common property of the three provinces. The river emerges from the recesses of the Australian Alps, where the loftiest heights occur. Being covered with perpetual snow, a perennial supply of water descends their slopes, and forms one of the few permanently flowing streams of the country, able to maintain its continuity, when others have been cut up by drought into a succession of ponds. The upper part of the channel was originally called the Hume, from the discoverers, Hume and Hovell, the first

Europeans who stood on its banks. This name is still retained by many writers, and occurs on most of our maps; but to prevent confusion, it is desirable to abandon it, and give the established name of the principal portion of the river, the Murray, to the whole. A vast extent of alluvial margin, covered with lofty and umbrageous trees, intersected with still narrow lagoons, running parallel to the stream, and filled by its overflowings, are the main characteristics of its basin, through an extent of more than a thousand miles. These lagoons, with reedy swamps, often render it difficult to approach the main channel. At Albury, a small township on the right bank, the high-road between Sydney and Melbourne crosses the river about four hundred miles from the former city, and two hundred and forty from the latter. Its principal affluents from Victoria, are the Mitta Mitta, the Ovens, the Goulburn, and the Loddon. After pursuing for a considerable distance a course nearly due west, the Murray describes a southern bend, and makes its nearest approach to Melbourne, the intervening distance being about a hundred and fifty miles. It then turns to the north-west, and meets the Murrumbidgee from New South Wales.

This tributary, the "beautiful river," according to the meaning of the native name, which has been properly retained, descends from the mountains about two hundred and fifty miles south-west of Sydney, and eighty miles from the coast of the Pacific. It follows a westerly

direction at an average distance of a hundred miles or more from the Murray, till near the junction. The country between the two rivers includes some of the finest squatting-grounds of New South Wales. In the early part of its course, the Murrumbidgee answers to its name, flowing between steeply-sloping hills of sandstone, covered with herbage, vines, and creeping plants. "As I sat in the boat," says a tourist, "I could see above me small, very small, cattle, in single file, now lost in the foliage, now reappearing, as, by zigzag well-worn paths, they descended to the water to drink. So lofty and steep were the cliffs, that I fancied they would fall down upon me ; at length they made their appearance at the edge of the stream, drinking beneath bowers of overhanging creepers—a huge bull, and a mob of portly cows." The banks are fringed with the beautiful swamp-oak, a tree intermediate in its appearance between the spruce and Scotch fir, which has here its southern limit in the colony. Small alluvial flats are occasionally left on either hand, devoid of timber. Before quitting the hilly region, the river receives several affluents ; it afterwards flows for upwards of three hundred miles without the slightest accession, passing by a tortuous channel through a low, flat, uninteresting country, exhibiting in many parts the aspect of absolute sterility and hopeless desolation. After losing some of its waters in marshes, the diminished current, about fifty feet wide, joins the Murray.

At the junction, the Murray has a width of 350 feet, by a depth of from twelve to twenty. "Its reaches," says Sturt, "were from half to three quarters of a mile in length, and the views upon it were splendid; its transparent waters were running over a sandy bed at the rate of two and a half knots an hour; and its banks, although averaging eighteen feet in height, were evidently subject to floods." "The river," he adds, "improved upon us at every mile; its reaches were of noble breadth and splendid appearance; its current was stronger, and it was fed by numerous springs." It next receives the Darling, which likewise collects the westerly flowing waters of New South Wales, further to the north than the Murrumbidgee, but loses them largely on its passage through the country, bringing down a wholly insignificant supply of water, except when in flood. The Murray soon afterwards enters South Australia, and makes a decided alteration in its course, turning from west to south, and preserving the latter direction to the sea, a distance of about 200 miles. Below the Great Bend, or elbow, as it is locally termed, it flows through a remarkable formation of fossiliferous shells, between high banks or cliffs, of a colour varying from light yellow to deep ochre, which in some places form the margin, and in others recede from it to the distance of one or two miles. A belt of shrubs and plants, beautiful, but useless, called the Murray Scrub, runs parallel to the stream in this part of its course.

extending from fifteen to twenty miles in breadth, in which many of the rare birds and animals of Australia are met with. Between the fossiliferous cliffs, the river follows a semi-circular route, alternately sweeping from side to side, entering Lake Victoria, where its course terminates, 170 yards wide at the embouchure.

The entire length of the Murray, including the windings, is estimated at between 1,300 and 1,500 miles. In its lower course, for upwards of 200 miles, it is never less than twelve feet deep, and generally forty feet, this great depth being frequently maintained close to the edge of the water. Birds of brilliant plumage, cockatoos, parrots, and flights of crested pigeons, enliven the banks, and noble gum trees are a common ornament. The river is subject to an annual flooding, rising and falling gradually. It begins to rise from the eastward in the commencement of July, and proceeds at the rate of about an inch per day till December, when it attains the maximum height of seventeen feet above its lowest level. The creeks and lagoons along its borders are in succession filled, and many of the adjoining flats are laid under water. "The natives," says Sturt, "look to this periodical overflow of their river with as much anxiety as did ever, or do now, the Egyptians to the overflowing of the Nile. To both they are the bountiful dispensation of a beneficent Creator ; for, as the sacred stream rewards the husbandman with a double harvest, so does

the Murray replenish the exhausted reservoirs of the poor children of the desert with numberless fish, and resuscitates myriads of crayfish that had long lain dormant underground ; without which supply of food, and the flocks of wild fowl, that at the same time cover the creeks and lagoons, it is more than probable the first navigators of the Murray would not have heard a human voice along its banks."

Lake Victoria, or Alexandrina, as it was first called, into which the Murray discharges, is in reality an inland sea, from thirty to forty miles in length, by from ten to twenty in breadth. Its waters are fresh for some distance from the entrance of the river, but become gradually brackish, and perfectly salt on receding from it. They are so exceedingly shallow, that the medium depth is not more than four feet ; and there is reason to believe that the lake is in process of filling up from the deposits of the river. It communicates with the ocean at Encounter Bay by a narrow channel which admits the tide, but is dangerous and impracticable even for boats, owing to the violence of the surf. Sir John Jeffcott, the first judge of South Australia, and captain Blenkinsopp, with two of their boat's crew, found a watery grave while attempting to pass through it.

The navigation of the Murray is an object of great importance and interest to the South Australians, who hope to draw down by it to their province, for embarkation, the produce of

the interior districts of New South Wales. This is at present sent in bullock drays to Sydney or Melbourne for that purpose, travelling about ten miles a day, the transit occupying some weeks. In August, 1850, the Legislative Council voted £4,000, to be equally divided between the two first iron steamers, of not less than forty horse-power, and not exceeding two feet draught of water when loaded, that shall successfully navigate the river to the junction of the Darling. To that point it is said to maintain an average width of about 300 yards, while the soundings that have been made in the months of September and October, give a depth of twelve feet at the shallowest. The only impediments that occur are in the shape of snags or fallen trees, which would have to be removed ; and higher up the river, as far as Albury, it is supposed that only similar obstacles would be encountered.

All the Australian rivers are more or less liable to floods, produced by heavy rains descending on the highlands. They are frequently remarkable for their sudden occurrence and great extent, ravaging the homestead of the settler, unless due care has been taken to place it above high-water mark. Trees standing on the borders of insignificant rills, or nearly dry channels, proclaim that a deluge has passed along, by a residue of grass, weeds, and sticks left in their branches, at an extraordinary height above the existing water. When captain Sturt, on his central exploration, reached the Darling,

he found it all but dry, with no perceptible current. In a few days, it began to flow rapidly, and quantities of grass and bark came floating down, covering the surface. It soon swelled considerably, and rolled its turbid waters along with violence. In a single night it had changed its character completely, from an obscure and lifeless stream to a broad and rapid river, bringing down large trees and drift. While sir Thomas Mitchell was following the channel of the Macquarie, where water was only to be found in holes, he was startled by a report that a flood was coming down from the Turon Mountains, but that it travelled slowly, and would not arrive until the following evening. At the time mentioned, a murmuring sound was heard, like that of a distant waterfall, mingled with occasional cracks, as of breaking timber. The noise increased gradually, and the flood came at length in sight, glittering in the moonbeams, and filling the empty bed of the river. But it was soon dispersed in a thousand lagoons, and the channel of the Macquarie became as exhausted as before. The Hawkesbury, near Windsor, has been known to rise the enormous height of ninety-three feet above its general level. In May, 1851, Wurrabangal, a village in the southern part of New South Wales, was the scene of a melancholy disaster from a sudden inundation. At this spot three mountain streams unite; they originate on the high lands of Maneiro Plains, on which heavy rains descend. Here a farmer

named Thompson, seventy years of age, had resided for some years, in a comfortable cottage, surrounded with a thriving establishment. During his absence from home the rain commenced, and a flood was rising on his return ; but supposing that the waters would not endanger his dwelling, he resolved to abide in it for the night, with his whole household, while his neighbours betook themselves to higher ground. The retreat of the party was soon cut off by the deluge, and they were compelled to place themselves on the roof of the building. Towards midnight, spectators on the hills witnessed by the light of the moon a sad catastrophe. The old farmer, six other Europeans, three New Zealanders, and several black natives, in all seventeen persons, with dwelling-house, stables, stacks, horses, drays, and dogs, were swept away. Such casualties may be avoided by attending to the warning, silently, though emphatically given by the marks of former floodings, and placing the location beyond the prescribed limits, instead of carelessly concluding that an interval of years without a visitation, is a security against its recurrence.

During the dry and hot summer of Australia, the opposite feature of exhaustion is impressed upon its inland waters. The larger rivers shrink in volume; the lesser lose their continuity, and become a series of detached pools; the mere streams entirely dry up. A colonial poet thus alludes to the changed aspect of the Hunter, one of the coast rivers, under its native

name of the Coquun, at different seasons of the year :—

“ Exhausted by the summer sun,
The schoolboy fords the broad Coquun ;
For then the slow meandering stream
Shrinks from the hot sun's fiery beam,
And, like a wounded serpent, crawls
From Cumberoy to Maitland Falls ;
But when the autumnal deluge swells
Each little brook in yonder dells,
And twice ten thousand torrents pour
From cliff and rock with deafening roar,
Oh ! then he rolls with manly pride,
Nor stream nor storm can stem his tide ! ”

It is common experience, during summer travelling in the interior, to find the channel, once occupied by a full tide, a bed of parched sand or stones, without a drop of fluid to quench the thirst of a wayfarer. The scene described in the book of Job is annually realized in this region : “ My brethren have dealt deceitfully as a brook, and as the stream of brooks they pass away :—what time they wax warm, they vanish : when it is hot, they are consumed out of their place.”

Certain parts of New South Wales appear to have been subject to cycles of extreme moisture and drought, extending through considerable periods, the alternation producing remarkable changes in the aspect of the country. Oxley, in 1817, found a noble expanse near the Lachlan, which he called Regent's Lake. When this was sought for by Mitchell in 1836, it was for the most part an extensive plain, covered with luxuriant grass. There was some water at one extremity scarcely a foot high, the refuge

of innumerable aquatics, black swans and pelicans, the last standing high upon their legs, above the remains of the lake. That it had been a splendid expanse was evident from the line of the shores; while, within this former boundary, stood dead trees of a full-grown size, apparently killed by too much moisture. The site appears to have been, in succession, woodland, lake, and plain. On most of our maps, Lake George is marked, extending into the counties of Argyle and Murray. In 1828, it was a fine sheet of water, seventeen miles in length by seven in breadth. But it was without fish, and surrounded by dead trees of the eucalyptus, some of them two feet in diameter, which also extended into it, until wholly immersed. One old native female remembered the time when the whole was a forest, a statement supported by the lifeless timber in its bed. In October, 1836, the entire lake was gone; and its basin was a grassy meadow, similar to the adjoining Breadalbane plains!

A succession of deep depressions is a very common arrangement in the structure of the beds of the Australian rivers. This is obviously the provision of an all-wise Creator, meeting the condition of a country where the waters rapidly run off the surface, and which is inhabited by native tribes of little constructive capacity. They act as natural tanks or reservoirs, retaining a supply of the vital element long after it has disappeared from other parts of the channels, giving to them the appearance

of a chain of ponds. These depressions are very strikingly exemplified in the Swan River of Western Australia. A writer speaks of meeting with a pool, two hundred yards long, thirty wide, and *thirty-six yards deep*, full of water to the brim, while, just beyond each end, the bed of the river was dry, or had only a little winding rill trickling among the grass and pebbles. A series of these "water-holes," as they are locally styled, separated by dry spaces, marked the course of the stream. One of vast size was noticed, three-quarters of a mile long, thirty or forty yards wide, and of great depth, full to the margin of beautiful clear water. Coming suddenly upon it, a stranger to the country would imagine that it might be traversed to the sea in a boat. Yet it suddenly ended each way, with a steep square termination, and the bed of the river beyond was merely a grassy hollow, full of trees and bushes, slightly elevated above the pool. The arrangement is precisely as if parties had set to work at different points to deepen the channel, and, after excavating different distances to considerable depths, had simultaneously suspended further labour. This structure belongs, more or less, to all the Australian rivers, with the exception, perhaps, of the Murray, where it is not needed. They have all continuous channels, used *in extenso* in the rainy season, with "water-holes" formed to be of service in the dry. The geologist asks, how these depressions, with their regular shape, great depth, and sudden termini in each direc-

tion, have been produced? But the question is best answered by a reverential and grateful reference to the finger of God. Man, however, may humbly copy these contrivances, and preserve in a dry and thirsty land, by artificial constructions, such as embankments and reservoirs, to which his science and industry are equal—an adequate supply, in all seasons, of the element so essential to the purposes of cultivation, health, and enjoyment. Strzlecki, Mitchell, and others, have pronounced in favour of the comparative ease with which such works may be executed in the country; and they have been accomplished in other regions by people of less energy, skill, and capital, than the Australian settlers.

IV. CLIMATE.

The northern part of Australia, embracing nearly half the whole territory, is situated within the tropics, and experiences the burning atmosphere of the torrid zone. But the colonized districts are extra-tropical. They are subject to a high, but more moderate temperature, varying according to latitude, elevation above the sea, and the other physical circumstances which determine the climate of particular localities. It has been already mentioned, that the seasons occur at precisely opposite periods to our own, the summer extending from the first of November to the first of March, and the winter from the close of May to the close of August. At Sydney, the

longest day, December 21, includes fourteen hours, from five o'clock A.M. to seven P.M., reckoning from sunrise to sunset. The shortest day, June 21, comprises ten hours, from seven A.M. to five P.M. In the summer, great heat is experienced; but it interchanges with a very genial temperature through the remaining eight months of the year. Thermometric determinations upon this point, collected during three years, for three principal places, Port Jackson or Sydney, Port Macquarie, nearer to the tropic, and Port Philip or Melbourne, more remote from it, are as follows, in degrees of Fahrenheit:—

SUMMER.

	Port Jackson.	Port Macquarie.	Port Philip.
Maximum of Temperature..	81°·9.....	88°·3.....	90°·6
Minimum.....	59 °0.....	61 °8.....	48 °8
Fluctuation	29 °9.....	26 °5.....	41 °8
Mean of the Season	73 °9.....	75 °0.....	69 °4
Hottest Month	Nov.....	Nov.....	Nov.

WINTER.

Maximum of Temperature..	73°·3.....	75°·3.....	69°·8
Minimum.....	45 °3.....	46 °8.....	36 °9
Fluctuation	28 °0.....	28 °5.....	32 °9
Mean of the Season	59 °3.....	61 °0.....	53 °3
Coldest Month	July.....	Aug.....	July.
Mean Temperature of the year	66 °6.....	68 °0.....	61 °3

The general reader will be enabled to appreciate these results by the statement, that the annual mean temperature at London is 50°, the mean of summer 63°, and of winter 39°. A higher range of the thermometer than that expressed in the table occurs when the hot wind blows from the central regions. Dr. Lang has registered 112½°, and Mr. Mackenzie as

much as 127° ; but this increment is very occasional. In the maritime localities, the summer days are relieved by the sea-breeze, which usually sets in about ten o'clock in the forenoon, blows fresh, and dies away about four in the afternoon. At night an equally steady and grateful breeze from the land springs up. The mornings and the evenings are delightfully cool. Owing to these moderating influences, and the extreme dryness of the atmosphere, the high temperature causes comparatively little personal inconvenience. It does not produce bodily lassitude or mental inertness. Out-door occupations may generally be pursued without discomfort. Even the sense of gratification is betrayed by buoyant spirits and the capacity for action, when overpowering languor and oppression would be the result of a far less degree of heat in the moist climate of England. But away from the coast, on low grounds, the fervent rays of the summer sun are less tolerable; the glare is painful, and the want of water frequently renders the season distressing.

Winter can scarcely be said to exist at all at Sydney. It seldom freezes so as to form the thinnest ice. But in the early morning the air has a bracing sharpness, and the grass is covered with a light white rime. Snow is almost entirely unknown. The only instance on record of a shower falling occurred June 17, 1836, which the children of the capital called "white rain," having never seen a flake before.

Fires are requisite morning and evening, sometimes through the day; but frequently soon after nine o'clock a warm sun and clear Italian sky render it eligible to desert the hearths, in order to sit by open windows; and no additional clothing is needed on walking abroad. At Paramatta, eighteen miles inland, it is several degrees colder in winter, as well as hotter in summer, than on the coast. Mr. Montgomery Martin mentions the curious circumstance of having, on a winter morning, eaten frozen milk in his garden there, with oranges just gathered from the tree, others remaining to ripen on it. In the interior of the colony, a layer of ice, about the thickness of a penny-piece, is formed on exposed water; but this is the limit of the process of congelation in lowland situations. A greater degree of cold is of course experienced in the mountain districts; snow falls plentifully on the loftier highlands, and lies for a short time on the downs of Bathurst, Argyle, and other elevated sites. Compared with the climatology of other localities, Port Macquarie, in latitude $31^{\circ} 25'$ south, according to Strzlecki, has the summer of Florence, Barcelona, Rome, or Naples; the winter of Funchal in Madeira, or Benares in India; and an annual average temperature similar to Tunis. Port Jackson, in latitude $33^{\circ} 51'$ south, by a similar comparison, has the summer of Avignon in France, Constantinople, Baltimore, or Philadelphia; the winter nearly of Cairo in Egypt, or of the

Cape of Good Hope; and its annual mean temperature corresponds to that of Messina in Sicily. Port Philip, in latitude $38^{\circ} 18'$ south, resembles in its summer Baden, Marseilles, and Bordeaux; in its winter, Palermo, or Buenos Ayres; and its annual mean is that of Naples. "I am aware," says colonel Mundy, "of the existence of one warming-pan in New South Wales—one only. I shall move the owner to present it to the Sydney Museum when she returns to England, perfectly certain that to ninety-nine out of a hundred Anglo-Australian visitors of the institution, the intent and purposes of the implement would be utterly inscrutable."

Terrific thunder-storms occasionally occur in the height of summer, especially among the highlands, where they far exceed in violence those to which we are accustomed, and rival the electrical explosions known in the interior of the United States. "I once," says Mackenzie, "passed a night far away from any house, among the mountains beyond Liverpool Plains, during one of the most awful thunder-storms ever experienced in this colony. The repeated flashes of lightning rendered darkness visible. The coruscations and lurid glare made it appear as if the atmosphere was on fire. The air was tainted with a sulphuric smell; the loud and rapid peals of thunder, reverberated from mountain to mountain, seemed like the artillery of heaven let loose to accomplish nature's dissolution. I was sur-

rounded by a range of lofty mountains, every one of which seemed to 'have got a tongue.' This war among the elements was succeeded by torrents of rain, to which I was completely exposed; for soon after the thunder-storm had begun, I took the precaution of removing my bed from under the trees, for fear of their attracting the lightning. Many a tree was that night struck, and instantly shivered to atoms. I slept none; my horses, which stood near me, refused to feed. When daylight appeared, extensive and fearful was the havoc effected by the combined power of the lightning and whirlwind. Trees which happened to attract the electric fluid were completely stripped of their bark, and split down the centre from top to bottom; while their branches, some of them a ton weight, were rent from the main trunk, and scattered in all directions, often to the distance of one hundred yards." These storms are frequently accompanied with hailstones of extraordinary dimensions. Lambs have been sometimes killed by them; and birds, fruit-trees, and vineyards proportionably suffer.

In traversing the vast plains of the interior, the mirage is often observed, deceiving the traveller with the distant appearance of water on the heated soil, and exhibiting the distorted or inverted images of natural objects, the result of the unequal refractive power of strata of air of different densities. The singular spectacle is also seen, in hot and dry weather, of whirlwinds marching in succession across these

apparently interminable levels, carrying up sand, leaves, grass, and other light bodies in their path, to a considerable height, whirling them round with great velocity. The columns maintain a perpendicular position. They seem to move at but a gentle pace, when viewed from a distance, though really proceeding at a rapid rate, so that horsemen have in vain tried to keep up with them. As some vanish, others arise, and join the procession. On crossing a brook or river, the water becomes disturbed, and on reaching hills their course terminates. The natives dread these moving pillars of sand from superstitious notions, imagining it a sign of speedy death to be included in the vortex of one. Egypt, Arabia, and other countries with highly-heated plains, exhibit the same phenomena; and little activity of the imagination is required to convert the appearances into aërial giants, indulging in pastime after laborious occupations. There is seldom any mischief occasioned; but hurricanes ending in whirlwinds, followed by torrents of rain, display tremendous power in certain parts of the country, utterly devastating the tracts they visit. Mr. Meredith, while journeying from the Morrumbridge to Bathurst, encountered one of these fearful blasts, in a wild region covered almost entirely with forests of lofty gum-trees. Happily for himself, he was not in its path, though close to the very edge. The morning had been gusty and threatening. As the day advanced, the air became warm,

and a few flashes of lightning, accompanied by loud thunder, betokened the approach of a storm. In a short time, a strange, loud rushing noise was heard; the atmosphere rapidly grew thick and dark, and the horse of the traveller trembled violently under the influence of intense fear. He had scarcely time to leap off his back, and involuntarily exclaim, "This is a hurricane," before it swept by in front. The roaring, crashing sound was deafening. Everything was in total darkness. But the furious tempest was almost instantly over; the atmosphere rapidly cleared, and in what a few seconds before had been a high and dense forest, the track of the storm was indicated by every exposed tree being prostrate, either broken or uprooted. These hurricanes appear to follow a direct route, have a very narrow sweep in proportion to the length of their course, and are remarkably well defined. Trees on the boundary have been entirely stripped of their branches on one side, while the trunks have remained standing with the branches on the other side uninjured, being just without the limit of the blast. On following the path of a hurricane, the evidence of its having terminated in a whirlwind has been observed, the fallen timber forming a circle, with the trunks directed to different points of the compass.

All the colonies are subject in summer to occasional blasts of what is called the "ho wind," from its extremely high temperature,

Under its influence the thermometer rises to 100° , and even 117° in the shade. Though it varies in intensity and duration, it is uniform in its direction. In New South Wales and Port Philip, especially the latter, it comes from the north-west; at Adelaide, from the north; at the head of the Australian Bight, from the north-east; and on the west coast, from the east. Looking to the map, it will at once be seen that these points on the compass refer to the unknown central districts, as the place where the wind has its origin. A breeze of highly-heated air blowing from that quarter is plainly incompatible with the idea of any expanse of water, or any mountain-chain of importance occupying the interior, while it as clearly certifies to the existence there of a vast extent of burning desert. Sydney is in some measure screened from its influence by the wall of highlands which separates it from the central region. Still the breath of the fierce sirocco is there an annual unwelcome guest, experienced on an average about four times every summer. Each visitation lasts from twenty-four to thirty-six hours, during which the atmosphere is like a current of air from an oven or a furnace. On the western or exposed side of the mountains, the wind is said to raise the mean temperature of a summer day 40° , while on the opposite or sheltered side it is increased by from 25° to 30° . At Melbourne and Geelong, unprotected by any lofty chain, the hot wind is felt more severely.

At Adelaide also, in close proximity to the central desert, it is intense, sometimes continuing as long as nine days. Upon the sirocco exhausting its strength, it is usually immediately followed by a violent gust from the south, "a southerly buster," in colonial phrase, which, being a cold wind, rapidly depresses the temperature. In the course of twenty minutes, the thermometer has been observed to fall as many degrees.

Experience varies as to the personal effect of the hot winds. Dr. Lang speaks of having performed Divine service during their prevalence with less inconvenience from the heat than has been felt in a crowded church in Scotland in summer. Mr. Jukes also states, as the result of his own experience, that if a person is obliged to expose himself to them, it is both possible to walk and work the whole day long in the very teeth of the sultry gale. But a sense of great personal discomfort is generally produced. Perspiration is arrested, the lips parch, and the skin tingles, though no injury is inflicted upon the human constitution, and that extreme lassitude caused by the sirocco of Italy is unknown. The grand annoyance of the current, which commonly blows with strength and steadiness, is not its burning temperature, but the impalpable dust it sweeps up from the interior plains, with gritty matter large enough to strike with painful acuteness on the face. The atmosphere, though clear of clouds, is rendered thick and hazy by its load

of minute particles. The sun is shorn of his radiance, and assumes a fiery aspect consequent on the red rays alone finding a passage through the dense medium.

“All in a hot and copper sky,
The bloody sun at noon
Right up above the mast did stand,
No bigger than the moon.”

Doors and windows are instantly fastened 'close at Sydney, Melbourne, Geelong, and Adelaide ; but the dust forces its way through the smallest apertures, covering every article of furniture and food within. Strzlecki, while sailing from New Zealand to New South Wales, was prevented making the harbour of Port Jackson for two successive days by the violence of the hot wind. Though sixty miles from shore, the heat exceeded 90° , and the sails of the ship were coated with a minute powder by the breeze. However innocuous to the human frame, the influence of this wind on vegetation, both indigenous and exotic, is extremely pernicious. Delicate flowers are at once shrivelled; every green thing is dried up like half-burnt paper; the fruit of the fig, as well as of the vine, is injured or destroyed; the red and blue grape commonly lose their colour and watery elements; the quality of the crops in general is deteriorated; and whole fields of wheat, barley, and other grain, are sometimes absolutely blackened by the heat, so as to be fit for nothing but to be cut as litter.

The results of observation with reference to the annual quantity of rain are very remark-

able, viewed in connexion with the prevalent dryness of the atmosphere, and the deficiency of surface water, for both in New South Wales and Victoria the amount is considerably above the average in the proverbially moist climate of Great Britain. The following is the register for ten years, taken at the South Head of Port Jackson, at a station two hundred and forty feet above the level of the sea :—

1842.....	48·32 inches in 137 days.		
1843.....	62·78	„	168 „
1844.....	70·67	„	157 „
1845.....	62·02	„	132 „
1846.....	43·83	„	139 „
1847.....	42·79	„	142 „
1848.....	59·15	„	155 „
1849.....	21·48	„	138 „
1850.....	44·87	„	157 „
1851.....	35·13	„	142 „

Total in ten years, 491 inches in 1,467 days, or 49 inches annually in 146 days.

It will be seen from the table, that a remarkably dry year, when compared with others, occasionally occurs. In 1849, the quantity of rain registered barely amounts to one-half as much as the minimum of previous years, and not to one-third of the maximum. But in this dry year, the precipitation nearly equalled the average rain fall of London, which is little more than twenty-two inches. The greatest quantity was registered in the months of January, February, April, and July; the least in September, October, and November. April and November were respectively the wettest and driest months. The annexed return of

the rain-gauge for three stations includes 8,730 days of observation :

	Port Jackson.	Port Macquarie.	Port Philip.
Summer.....	24.42 in.....	37.58 in.....	13.25 in.
Winter	28.00	25.10	17.47
Annual quantity	<u>52.42</u>	<u>62.68</u>	<u>30.72</u>

The annual amount of rain in these colonies is generally copious instead of being deficient, but the distribution is irregular. While with us a moderate degree of precipitation is somewhat equally diffused throughout the year, an enormous quantity falls in a very brief interval from the Australian sky, and then for considerable periods the azure vault seems as though it had never known a cloud. Instead of a quiet drizzle, the shower is often a thorough deluge, descending with extraordinary violence, and causing a temporary inundation. On two occasions at Sydney, within twenty-four hours, the immense falls of more than twenty inches have been recorded, nearly equal to the entire annual descent at London. This prodigious supply is, however, soon spent, either by running off the surface, or by the processes of evaporation and absorption, which are in energetic action owing to the high temperature. But notwithstanding a generally copious annual precipitation, New South Wales has experienced seasons of long continuance of most distressing drought, when not one drop of rain has fallen, or scarcely any for two or three years in succession. These tremendous droughts,

the causes of which are quite hidden, appear to occur periodically, after intervals of from ten to twelve years. Happily their range is now known to be comparatively limited, and they have not been experienced at all either in Victoria or South Australia.

The character of the climate has now been fully stated, at least as far as its disagreeables are concerned. In much wisdom and mercy to mankind, the Creator has so arranged their external condition, that in every region of the globe natural incidents occur, of a trying or warning complexion, designed and adapted to rouse attention to the oft-forgotten truth, "This is not your rest." But, duly considering the advantages of the Australian climate along with the discomforts, it may be considered one of the finest in the world. Through eight months of the year, or from the beginning of March to the commencement of November, the weather is peculiarly delightful. The sky is seldom clouded; and day after day, for a succession of weeks, the sun looks down upon the earth in undimmed glory from the northern heaven. Showers are not unfrequent during this interval in ordinary seasons, refreshing the energies of animal and vegetable life; yet rarely will any arrangement for out-of-door pastime be marred, or journey of business be hindered by the elements. The salubrity of the climate is also unquestionable. Great and rapid changes of temperature, with strong contrasts between midday heat and midnight cold, are trying to the senses, but do not

seem to injure the constitution. Camping out at night, sleeping on the ground, with a saddle for a pillow, and the stars glittering through the foliage of a tree, is a common incident of a Bushman's life, attended with no bad results, though in most other countries, fevers, agues, rheumatism, and affections of the lungs, would be the consequence. Notwithstanding an endless series of morasses and reedy swamps, covered with stagnant water and rank vegetation, no part of the world is more exempt from all that class of disorders which originate in impure air and deleterious miasma. The most common diseases are ophthalmia, arising from the reflection of the glare of sunlight, which may obviously be guarded against; dysentery, generally caused by imprudent diet, and most frequently by intemperance; and influenza, which is rarely fatal except to young children, and those far advanced in life. It is true that the crowds which have recently rushed to Australia have experienced great sickness and mortality; but the extraordinary social circumstances into which they have been thrown, after being cooped up on ship-board, is doubtless one great cause of this.

The general health of the people in the long-settled districts, with the low rate of mortality, sufficiently proves the healthiness of the climate. At Bathurst, a small town, only two deaths occurred in the space of twelve years. At Moreton Bay, one of the hottest parts of New South Wales, out of twelve hundred convicts

and soldiers, only one was in the hospital in six months. The ratio of mortality among British troops, whites, stationed at different parts of the empire, for the year 1849, is remarkably favourable to Australia.

	Per 1000.		Per 1000.
Australia	8	Madras	22·4
Antigua	10·9	Malta	30·1
Barbadoes.....	128·8	Mauritius	14·6
Bengal	61·3	Newfoundland.....	10·3
Bermuda	8·4	Nova Scotia and New	
Bombay.....	26·6	Brunswick.....	19·7
British Guiana.....	14·2	St. Helena.....	8·4
Canada	15·6	St. Kitts.....	19·4
Cape of Good Hope ...	13·3	St. Lucia	17·4
Ceylon	21·5	St. Vincent	6
Dominica	40·4	Tobago	98·6
Gibraltar	8·4	Trinidad	33
Grenada.....	12·3	Windward & Leeward	
Ionian Islands.....	23·1	Islands	68·4
Jamaica.....	48·3		

The early development of manhood and womanhood, both physically and intellectually, is one of the characteristics of human life in Australia, and is doubtless referrible principally to climate. The girl of fifteen is equal to her contemporary several years older in England. But owing to this quicker movement of the springs of life, the indications of wear and tear in the machine are exhibited at an earlier date, though the average duration of its existence is about the same. Precocious development is followed by the fading of personal attractiveness—the appearance of “the sere and yellow leaf”—at an age when female beauty is in full bloom at home. The white natives of these colonies exhibit the features usually observable in a transplanted British

race, though they are not so strongly marked as in the United States, for which the difference in the length of time during which exposure to new circumstances has subsisted may sufficiently account. Out-of-door habits of life are unconnected with the ruddy complexion they commonly produce in the mother country. The stature is tall, the form spare, the face pallid, and the voice less sonorous. It is remarkable that the pronunciation of English, as well as of other European languages, always suffers after having been spoken for some time in a new region. The nasal drawl so common in the United States is observable in the English spoken in Australia, Van Diemen's Land, the Cape, China, and the east. The Anglo-Australian males are popularly termed "cornstalks," in allusion to their lank appearance. The females are styled "currency lasses," while true English women are distinguished by the epithet of "sterling."

A salubrious and balmy atmosphere, fine skies, fertile fields, and golden sands, important in their places, are not the essential elements of human happiness, or of the prosperity of nations. Some of the most highly-favoured sites of the globe are occupied by the most wretched and impoverished races. The blessing of God alone maketh rich. In His hand it is to make great; and no man has a right to expect his benediction in any country, unless living in his fear, and walking as in his presence. In the most auspicious external cir-

cumstances, man must remain a stranger to true and enduring peace, unless reconciled to his Maker through faith in Christ, renewed in the spirit of his mind by the power of the Holy Ghost, and conscientiously conforming to the rule of righteousness. Without this, the plague of his own heart will accompany him wherever he may wander—east, west, north, or south—and prevent him from experiencing real enjoyment in worldly success, equally at the antipodes as on his native shore. But in every land, the saying will be found true, “Godliness is profitable unto all things, having promise of the life that now is, and of that which is to come.”

CHAPTER II.

NATURAL PRODUCTIONS OF AUSTRALIA.

BOTANY—Character of the vegetation—Eucalyptæ and acaciæ—The “big tree”—Wild figs—Nettle tree—Bunya-bunya—Palms—Grass tree—Edible fruits—Native tulip—Gigantic lily—Grasses—**ZOOLOGY**—Peculiarities of the animal kingdom—Kangaroos—Native hunt—Opossums—Ornithorhyncus—Wild dog—The emu—Lories—Robin—Blue wren—Bee-eater—Lyre-bird—Bell-bird—Coachman—Knife-grinder—Laughing jackass—Mound-building birds—Bower-birds—Black swan—Sooty petrel—Reptiles—Insects—Fish—**MINERALOGY**—Precious stones—Copper, lead, iron—Coal—Building-stone—Statuary marble—Porcelain clay.

THERE is no part of the globe where the forms of animal and vegetable life are so distinct from those of other countries as the middle and southern districts of Australia. This dissimilarity is the prime characteristic of the botany and zoology. Beauty, though eminently belonging to many objects, is by no means a feature prominent or prevalent with the general products of living nature. Nor is utility to man an attribute extensively developed. This does not arise from any deficiency in the soil and climate; for all the important food-plants of Europe, with many belonging to other regions, are cultivated with the greatest success, while

all the animals best adapted for human sustenance, and the purposes of social economy, have been introduced with a similar result.

I. BOTANY.

Extreme uniformity characterizes the vegetation of the Australian colonies. The same trees, or nearly so, perpetually occur, giving to the woodlands a tame monotonous aspect. *Eucalyptæ*, the "gum trees" of the settlers, and *acaciæ*, or "wattle trees," are the predominant members of the forest. These two genera are not only more widely diffused than any other, but, if taken together, and considered with respect to their mass of vegetable matter, they are supposed to be nearly equal to all the other plants of the island-continent. It is a striking and very general peculiarity of their economy, that the leaves are inserted vertically, instead of extending in a horizontal direction, as in Europe. In consequence of thus presenting their edges to the light, they afford but little protection from the scorching rays of the summer sun. This result is aided by the foliage of all the Australian timber being very scanty, wanting that dense and massive appearance with which we are so familiar. The woods have, therefore, no sombre shadows—no glades of profound gloom—but are comparatively light and airy scenes. If this is a disadvantage to the traveller, needing a "shadow in the day-time from the heat," it is a gain to the farmer, as it allows the grass to grow where it other-

wise would not. In common with the prevailing character of vegetation in the southern hemisphere, South America and South Africa, the trees are not of the deciduous class, or those which cast their leaves periodically. Thus one of the most glorious spectacles of nature is entirely wanting in the landscape, the gradual and general change of the forest from leaflessness to foliage in the vernal season. But though technically "evergreens," the term is a misnomer with reference to the colour. "Never-green," or "ever-brown," is far more true to the reality; dull reddish, brownish, and leaden hues prevailing, corresponding to those of our autumn. Owing to these tints, and the leaves being without gloss, the woods have not that bright, reviving external aspect, so characteristic of their appearance with us in spring and summer. They have also a desolate, untidy, and ragged air, arising from the bark of several species falling annually, or hanging down in long shreds waving to the breeze. Intermixed in the forest with the gum-trees, of which there are not less than a hundred species, and with the still more numerous family of wattle trees, are many cedars, tall and cypress-like casuarinas, native cherries, great quantities of the grass tree, wild figs, myrtaceous plants, and others of a parasitical kind.

The young gums have a very beautiful appearance. Some species afford valuable timber, and attain truly enormous dimensions. They have been found to be forty-five feet in

circumference at four feet from the base ; and it is not uncommon to see a tree forty feet in girth, rising a hundred feet without sending out a branch. One of these giants would be more than sufficient to build a house for the accommodation of a family. In the Illawarra district, to the south of Sydney, there was formerly, on the slope of a mountain, by the side of a rugged bridle-road, a dead tree of immense size, which bore the name of "the big tree," and served as a resting-place for travellers. It was about a hundred feet in height, perfectly hollow, the internal parts having been consumed by fire. There was an entrance on one side, as wide as a church-door, capable of admitting two horsemen abreast. Three horses of the ordinary size, and their riders, have been accommodated at the same time in the interior of "the big tree."

The wattle trees, distinguished by countless myriads of yellow-tufted flowers and bean-like pods, furnish timber for rude dwellings in the interior, and various domestic purposes. Yellow-wood and rosewood trees, with numerous cedars, supply ornamental material for cabinet-work, household furniture and fittings. The red cedar grows abundantly on alluvial lands by the borders of rivers, yields a soft, light wood of beautiful texture, which takes a fine polish, and in colour resembles Honduras mahogany. Churches, chapels, and other places of public resort, are generally fitted up with this wood, and have a very elegant appearance.

The wild figs are remarkable for their colossal proportions. The *ficus macrophyllus*, called at Sydney the Moreton Bay fig, has a leaf about a foot long and four inches broad, of a regular oval shape, very similar to that of the common laurel. An example, growing on the bank of the Manning River, exhibited a bulk superior to any of the baobabs of Africa, or chestnuts of Etna; in fact, larger than any tree with a single stem which has ever been mentioned by travellers. It is a peculiarity of this tree to throw out buttresses of wood all round the trunk. These projections are thin in comparison with their height and length, and very gradually slope for many feet from the trunk to the ground. As they do not grow in contact with each other, it would be unfair to give the measurement of a line drawn round them for the dimensions of the tree; but at six feet from the ground the circumference of the real cylindrical part of the trunk was sixty-six feet, measured as if the tape had been passed through the projecting parts. At the same height, if the buttresses had been included, the measurement would have been one hundred and ten feet; and at half the height, three hundred feet. These partitions would have afforded stalls for the horses of a squadron of dragoons. The wild figs furnish a grateful food to various tribes of birds, as well as to the aborigines. Ferns, reeds, and nettles, likewise attain extraordinary stature and thickness in the neighbourhood of rivers, and other situations favourable to their growth. They

have quite an arborescent habit, and form impenetrable jungles. A gigantic stinging nettle, *urtica gigas*, is sometimes forty feet in height, with a stem nine or ten feet in girth, the sting of which is said to be painful enough temporarily to paralyze the limb. The nettle tree produces a soft and spongy wood; the large leaves resemble in shape those of the mulberry, and possess the bright green velvet appearance of the geranium leaf. The slightest touch of one inflicts a sting. Horses are said to suffer more from it than men, their skin rising in large blisters, and great temporary constitutional derangement apparently taking place.

The Norfolk Island pine, the most noble and stately member of its family, occurs in various parts of New South Wales, and has been seen two hundred and seventy feet high, by twelve feet in diameter. Another species, the Moreton Bay pine, abundant on alluvial lands, and the sides of hills in that district, is remarkable for the slenderness of the stem in proportion to its height. Individuals have been measured one hundred and seventy feet along the trunk, with only a diameter of two feet. A third species, the bunya-bunya, is distinguished by its great peculiarity of outline, limited range, and utility to the native tribes. The outline of the tree is like that of a large umbrella, upon an exceedingly long stick. It rises often to the height of one hundred and fifty feet, with a diameter of five or six feet, which is maintained to a considerable altitude, the trunk not tapering in a perceptible manner for sixty or

seventy feet from the ground. The stem is covered with a black bark, scored all over with horizontal lines, set very close together. About one-third of the height is occupied by dead branches, and the living top does not comprise more than one-fifteenth of the entire altitude. The branches, which are set on symmetrically, are very thin ; and they never divide, but continue to grow from the point alone, until the upper kill the lower by obstructing the light. The bunya may be recognized at the distance of some miles from its peculiar form. It has only been known since the year 1840, being confined to a range of mountains in the northern part of New South Wales, where it occupies a space of about fifty miles in length by ten in breadth. Once in three years the tree bears fruit, when the aborigines gather from all the surrounding country to feast upon it. The cones are about a foot long by three-quarters in diameter, but so entirely covered with sharp points that a hedgehog, or a ball ten pounds' weight bristling with needles, may as readily be handled. The edible part of each seed is about the size of the kernel of a Brazil nut, and one seed is contained in each scale of the cone. To secure the natives in the enjoyment of their triennial banquet, the colonial government has prohibited the felling of the tree ; and stations are not allowed to be planted, nor stock run, in the bunya-bunya country.

In the northern parts of New South Wales,

the vegetation is of a tropical character, palms and bananas flourishing by the side of the English oak at Port Stephen, surrounded by vines, lemons, and oranges, of luxuriant growth. Palms extend as far south as the Illawarra, but are not seen in the interior. The district so called is a belt of land stretching along the coast, about sixty miles in length by from four to six miles in breadth, remarkable for the beauty, variety, and vigour of its natural vegetation. This appears to be chiefly owing to the nature of the soil, a rich black mould, composed of disintegrated trap rock, the district exhibiting various indications of volcanic origin. Lofty cedars, graceful tree ferns, and stately palms, raise their heads over a thick undergrowth of wild vines, creeping plants, and shrubs. Travellers who have visited the interior of Ceylon and the Indian Archipelago, have been reminded of the splendid botany of these regions by the scenery of the Illawarra. Grassy meadows are interspersed throughout, destitute of timber, and enclosed with a border of palms. The most common species is the fan-palm, or cabbage-tree, the leaves of which are used to form a kind of hat universally worn by the colonists. It shoots up, a slender, branchless stem, to the height of from sixty to a hundred feet, crowned with a large canopy of leaves, which wave gracefully to the passing breeze.

Perhaps the most strikingly novel plants of the entire region are the grass trees, which are common to rocky places, poor soils,

and open situations. Their presence indicates the spot to be barren—except to the botanist. A young individual appears to have no stem, but exhibits very long, narrow, and sharp leaves, growing erect for a foot or more, then curving over towards the ground, forming a thick boss or circle. But as the plant grows, a stem is produced, rising from four to eight or ten feet, and two feet in circumference, rough with scars left by the falling leaves. From the summit there depends an immense cluster of fibrous, grass-like foliage, bearing some resemblance to the palm-tree when viewed from a distance. From the centre of this cluster a stalk projects, like an enormous bulrush, frequently measuring ten feet and more in height, terminating with a spike of a yellowish brown colour. Of this stalk the natives make the shafts of their spears, and some parts of the pith of the trunk form an article of their food.

There are no edible fruits or plants, indigenous to the soil, of the slightest importance to civilized society for the sustenance of life, or the gratification of the taste, though several are useful articles of provision to the miserable aborigines. A low, creeping, prickly plant produces a berry about the size of a currant, and bears the name of the native cranberry. The appearance of the fruit is tempting, having a peach-like bloom ; but the reality, as to flavour and consistence, has been compared to a marble covered with a piece of thin kid. There is also the native cherry, famed for having the stone

outside, an instance commonly quoted to illustrate the contrarieties of the country. The fruit resembles the yew berry, but is less pleasant to the taste, with a hard seed growing from the end, fancifully styled the stone. The wooden pear-tree is apparently clothed with enticing produce, about the size of a jargonelle pear ; but it is really a hard structure encasing the seed vessels. In barren scrubs and brushes, the dwarf honeysuckle is abundant, yielding at certain seasons an immense quantity of beautiful transparent honey, which stands in large drops among the filaments of the flower cone. Small shrubs, with yellow and golden blossoms, abound ; climbers, with rich crimson and other colours, are numerous in the woods ; and humble plants make the earth gay with blue and golden dyes. But nearly all the native flowers are without odour. One of the most magnificent of the floral tribe is the waratah or native tulip, a tall, stately, regal plant, straight as an arrow, with a woody stem, from three to six feet in height, growing on the slopes of the hills. It bears leaves of the richest green all the way up, in shape resembling those of the oak, but considerably larger. The flower at the top of the stem is entirely of the most vivid crimson, and looks like a flambeau lighted in the forest. The gigantic lily, or spear-flower, is another splendid indigenous production of vegetable nature. From the centre of an immense group of long, broad, curving leaves, the stalk rises to the height of fifteen or twenty feet, and of

proportionate thickness, crowned with a huge cluster of gorgeous crimson lilies. The principal grasses are the oat grass and kangaroo grass, with two species of rye grass, and other varieties. Of these, the oat grass is the most generally diffused. It affords excellent pasturage, is eaten by all kinds of stock, but does not stand the winter. The seeds, bruised between stones and baked with cakes, form an article of diet to the natives. The kangaroo grass abounds in low warm places, and is remarkable for its succulent properties. But the grasses do not uniformly clothe the surface, as in the instance of our own pastures. They grow in tufts, with spaces of bare ground between them, and hence a very considerable area of country is required to sustain a flock of sheep or drove of cattle.

II. ZOOLOGY.

The animal kingdom in Australia, like the botanical, exhibits very singular peculiarities. 1. Of mammiferous quadrupeds, there is a remarkable paucity of species, as compared with the total amount existing in other parts of the globe, and the area of the country. Thus, of 1,346 species of known quadrupeds, Europe possesses 150, and Australia only 75 ; and deducting from this number those which are marine, there will be left only 53 species of mammalia inhabiting the land. There is also a remarkable paucity of individuals as well as species, for hundreds of miles of the interior

may be traversed without the traveller encountering a single quadruped. 2. Of the land animals, the entire number is peculiar to the region, not a single species being common to Europe, Asia, Africa, or America. 3. Three great natural orders are entirely unrepresented, the quadrumana, pachydermata, and ruminantia. In other words, none of the monkey tribe; nor any of the thick-skinned animals, as the elephant, rhinoceros, or horse; and none of the ruminants, as deer, oxen, or sheep, belong as natives to the zoology of the country. 4. With very few exceptions, the land animals are of the marsupial order, so called from the females being furnished with a peculiar pouch, (*marsupium*, a bag or purse,) in which the immature young are received and nourished, and to which they afterwards retreat on approach of danger. Australia is the great metropolis of this order, though certain species of the group are found in the Molucca Islands, and one genus, containing many species, is peculiar to the New World. The remains of marsupial animals have been met with in a fossil state in Europe, as well as Australia and America.

The principal quadrupeds are the kangaroos, a numerous family, containing many species. They are vegetable-feeding animals, browsing upon herbage, and in some cases chewing the cud like the ruminants. They move by a succession of springs, compassing twenty feet or more at a single bound; they clear broad gullies and the lower brushwood with surprising

agility, and proceed by this singular mode of locomotion at a rate which outstrips for a time the fleetest horse. Some are of great size, being nearly as tall as a man when in their common erect position; others are as small as the common hare, and strongly resemble it in their general appearance. The kangaroo is timid and inoffensive, but will defend itself with great vigour when closely pursued in the chase, having a formidable weapon in its claws. The natives hunt it for food, and the colonists for sport. But this is only at the very outskirts of the settled districts, and even there the animal has become strange. Two or three, or even six, large strong greyhounds are put upon its track, and a smart chase is the result. If water is near at hand, the kangaroos make for it, and take possession of the deepest part in order to keep their pursuers at bay. In some cases they drown the dogs, seizing them with their forearms and keeping them under the water. Frequently they take up a position with their back against a tree, and show fight for a considerable time, occasionally with success, by ripping up or wounding the dogs in a severe manner with their hind claws. Reptiles and rapacious birds are other enemies. A traveller relates having had his attention drawn to a curious misshapen mass, which came advancing from some bushes with a novel and uncouth motion. He fired, and it fell. On going up to the object, he found it to be a small kangaroo, enveloped in the folds of a large snake. The kangaroo was now quite

dead, and flattened from the pressure of the reptile, which being surprised at the disturbance it met with, began to uncoil itself, and was despatched. In the course of an excursion to a settler's farm in a sequestered part of the country, Dr. Lang observed two eagles in the act of killing a young kangaroo of one of the larger varieties, which they had been running down. The birds, scared by his approach, left their prey, and perched themselves leisurely on the branches of a neighbouring tree; while the animal, which had only been stunned or slightly wounded, instantly sprang up, and bounded off with prodigious leaps down the valley. This species of hunt is always conducted by two eagles in concert. One continues to fly at the kangaroo's face till it becomes confused, while the other is ready whenever it stands still to pounce upon its head, and pierce the brain with its talons.

Swiftly as the bounding gait of the animal carries it along, the natives sometimes effect its capture by the process of tracking. This method of hunting elicits every qualification prized by savages—the skilful exercise of the senses, endurance of hunger and thirst, unwearied bodily exertion, and indomitable perseverance. To perform this feat, the track of the kangaroo is found, and followed till the animal is seen. It flees timidly before the hunter, who pursues its course, and the same process of flight and pursuit is repeated. At night-fall, the native lights his fire, and sleeps upon the track. With the early dawn the hunt is resumed, and

towards the close of the second day, or in the course of the third, the kangaroo is wearied out, and falls a victim to his pursuer. None but a savage in the pride and strength of manhood can succeed in this chase, and he who has frequently practised it always enjoys great renown among his fellows. One of the aboriginal dances is called the "kangaroo dance." A savage, wearing a long tail, drops down on his hands and knees, pretends to graze, starts to look about, and mimics the demeanour of the animal as closely as possible; others, in the character of dogs and hunters, perform their part in a circle round him, at a short distance. A few years ago, droves of these pacific creatures were of common occurrence; but the gun and dog of the colonist have destroyed them. It may be long before they are wholly exterminated, but their doom is fixed.

There are numerous *flying squirrels*, of a beautiful slate colour, with delicate fur; *opossums* of many varieties; *bandicoots* and *wombats*, burrowing animals, feeding on grass and roots. The opossums live in hollow trees, usually at a considerable height from the ground, and are rarely visible by day. At night they descend to make their meal on the herbage or on the corn of the settler, and may be seen gambolling among the branches around their habitations. A full-grown individual is larger than the common cat, with an innocent-looking face, dark brilliant eyes, monkey-like feet, and a long tapering tail about the thickness of a sable boa

at the base. The tail is strongly prehensile, and holds so tightly, that they often swing their whole weight upon it; and when shot dead, sometimes hang for a minute by it before falling. On fine moonlight nights they are killed by scores, either for the sake of their warm skins for rugs, or to check their ravages among the rising grain.

The most peculiar animal of Australia is the *ornithorhyncus paradoxus*, a creature so anomalous, that when the first specimens of it arrived in Europe, naturalists suspected the organization to have been fabricated for the purpose of imposture. It has the bill and webbed feet of the duck united to the body of a mole, and bears the common name of the water-mole, being semi-aquatic. It frequents tranquil waters, seeking its food among aquatic plants, and excavating burrows in the steep and shaded bank. The motions of its mandibles when procuring food are similar to those of a duck under the same circumstances. A number of these animals are always found together, but it is difficult to watch their habits, as their sense of hearing is so acute that they disappear at the slightest noise, plunging into the water, in which they swim so low that only a very small portion of the body can be seen. Familiarity with the *ornithorhyncus* has not diminished the astonishment excited by the first observation of it, as in almost equal proportions it partakes of the nature of quadrupeds, birds, and reptiles.

There are no beasts of prey of importance except the *dingo*, or wild dog, the "warragat" of the natives. It is about the size of a small fox-hound, partaking in form of many of the characteristics of both dog and wolf, and not unlike the cross produced by the intermixture of those two races. It has a bushy tail, a coat of moderate length, and is usually of a buff or bay colour. It is easily rendered tolerably tame, but is never to be trusted; for the lessons of years will be forgotten in a moment on escaping from confinement, and ferocious habits be immediately resumed. The dingo never, or very rarely, barks, but howls or yells at night with a most dismal, unearthly kind of tone. This animal is remarkably tenacious of life, an obstinate fighter, contends in silence, utters no cry of pain, and, like the grim wolf, dies as hardly as he has lived. Remarkable instances are related of this power of endurance. Mr. G. Bennett mentions the case of one, which had been beaten so severely that it was supposed all its bones were broken, and it was left for dead; but after the person had walked away some distance, upon accidentally looking back, he was astonished to see the dingo rise, shake himself, and march into the bush, evading all pursuit. The wild dogs are the scourge of the flocks of remote settlers, and are carefully exterminated. They seldom kill their victim at once, but commence eating it, at whatever part they chance to have first laid hold of, three or four often gnawing together at the unfortunate

animal. When interrupted in their visits, a goat, a calf, or sheep, will frequently be found with a limb half eaten away; and the utmost vigilance is requisite at far inland sheep stations to protect the flocks from their attacks. The latter are all carefully folded and guarded at night; two yards or folds are usually erected near together, between which the watchman has his box, with a bright fire, and frequently he walks round with his dogs to keep off the audacious prowling enemy.

The ornithology of Australia, though not so anomalous in its character as that of the animal tribes, has peculiar and striking features. The largest of the birds is the *emu*, or *cassowary*, found in nearly all parts of the country beyond the colonized territory, but annually becoming scarcer as settlements advance inland. It closely resembles the ostrich in appearance, next to which it is the tallest bird known, standing from five to seven feet high. The general colour is a dull brown, mottled with dingy grey. It has only miniature wings, and a kind of downy clothing as a substitute for feathers. The eggs are about a foot in length, of a green colour, esteemed good and nutritious food. The flesh of the bird is also eatable, especially of young individuals. The emu is remarkably wild and shy, but is easily tamed if taken young. It runs with extraordinary speed, and is not readily overtaken by the fleetest greyhound; any noise may be made in hunting it without inconvenience, the sense of hearing

being dull, but that of sight is proportionably keen; hence it frequents the open plains, being there most secure from whoever may invade the solitude of the desert. Its capture requires skill and caution as well as speed. To attempt to lay hold by the side is dangerous, as an emu would break a horse's leg with a kick; but if a dog fastens upon the neck, as those which are trained learn to do, the bird is immediately overthrown, and easily killed.

Rapacious birds are numerous everywhere; eagles, vultures, falcons, hawks, and owls of various kinds. A species of vulture, when pressed by hunger, is said to be sufficiently daring to attack the natives themselves. Birds of exquisitely beautiful plumage also abound; parrots, parroquets, and cockatoos. The *lories* are the most brilliant of the parrot tribe. The back and upper portion of the body are a bright gleaming blue, while the breast and under parts are the most intense rose colour. Seen for the first time, it is scarcely possible to believe them real, as they rise in a flock from the ground, brightening the sunshine with their glorious hues. The Australian *robin* is another exquisitely lovely member of the feathered tribe, having some correspondence to his English namesake, the same brisk air and quick manner. The breast is the most vivid geranium colour, softening to a paler shade towards the wings, which are glossy black, with clear white markings across them. The back is also black, with a white spot on the

crown of the head, and the tail-feathers are also barred with white. These colours are so distinct and sharply defined, as to convey the idea of different garments, arranged with extreme care, and fitting with the utmost precision. A small bird, the *blue wren*, is remarkable for the change which its appearance undergoes. In the winter months, the garb worn is plain and unassuming, and the sexes correspond in costume; but as spring advances, the male exhibits a total transformation, not only in the hue, but in the texture of the plumage. It is hardly surpassed for resplendent beauty by any of the feathered race, except perhaps the humming-birds of America. Nor is the change confined to the plumage, but extends to the habits of the warbler, which pass from a somewhat staid demeanour to great vivacity of song and manner. Among the migratory birds, the *bee-eater* is fascinating from the elegance of its form, and the graceful mode of its flight. The same pleasing associations are connected with it in the colonies, as with the swallow and cuckoo in England, its arrival being a certain harbinger of the return of spring. It appears in New South Wales, and all parts of the same latitude, in August, and departs northwards in March, the intervening period being employed in the duties of incubation and rearing. During the summer months, it is universally spread over the southern portion of Australia, and over the northern in winter.

The *lyre-bird*, so called from the graceful form of the tail in the male, which resembles that of a lyre, is peculiar to the south-eastern coast. But little is known of its habits, as it very rarely approaches the abode of civilized man, and is so excessively shy, that even a sight of it can with difficulty be obtained. "While among the bushes," says Mr. Gould, "I have been surrounded by these birds, pouring forth their loud and liquid calls for days together, without being able to get a sight of them ; and it was only by the most determined perseverance and extreme caution that I was enabled to effect this desirable object, which was rendered the more difficult by their often frequenting the most inaccessible and precipitous sides of gullies and ravines, covered with tangled masses of creepers and umbrageous trees. The cracking of a stick, the rolling down of a small stone, or any other noise, however slight, is sufficient to alarm them ; and none but those who have traversed these rugged, hot, and suffocating brushes, can fully understand the excessive labour attendant on the pursuit. Independently of climbing over rocks and fallen trunks of trees, the sportsman has to creep and crawl beneath and among the branches with the utmost caution, taking care only to advance when the bird's attention is occupied in singing, or scratching up the leaves in search of food. To watch its actions, it is necessary to remain perfectly motionless, not venturing to move even in the slightest degree, or it vanishes from

sight, as if by magic." The lyre-bird is capable of performing extraordinary leaps, and will spring ten feet perpendicularly from the ground. Though called a pheasant by the settlers, it is in reality a member of the thrush family, about the size of a small domestic fowl. Its natural note is most frequently heard morning and evening, and resembles the cry of *bleu bleu*; but the bird is a mocker, and will imitate every sound heard in the bush; the croak of the crow, the scream of the cockatoo, the chatter of the parrot, and even the howl of the dingo.

The melody common to the English woods is not heard in the Australian forests; the notes of birds being far more generally monotonous, peculiar, and discordant, than musical. Some are familiarly styled after their tones. The *bell-bird* has won the appellation from the resemblance of its deep full voice to the sound of a bell. The *coachman* has that title from its chief note being a long clear whistle, finishing with a noise exactly resembling the smart crack of a whip. The *knife-grinder* is distinguished by giving utterance to a sound, which might be mistaken for that of grinding a knife on the grindstone. But the most extraordinary chant is that of the *laughing jackass*, which it is impossible to hear without risibility. "He commences," says a writer, "by a low cackling sound, gradually growing louder, like that of a hen in a fuss; then suddenly changing his note, he so closely imitates Punch's

penny trumpet, that you would almost affirm it was, indeed, the 'roo-too-too' of that public favourite you heard. Next comes the prolonged bray of an ass, done to the life, followed by an articulate exclamation, apparently addressed to the listener, sounding very like, 'Oh, what a Guy !' and the whole winds up with a suppressed chuckle, ending in an uproarious burst of laughter." Where many of these merry birds congregate together, the effect is droll in the extreme, provoking the most gloomy-minded listener to laugh in concert. First one begins alone, and laughs lustily at the top of his voice ; a second, third, and fourth, then take up the strain like glee-singers, till the whole party are fairly off, and the very trees seem to peal out along with them. The bird is one of the parrot tribe, useful as an adroit destroyer of snakes, guanos, and other reptiles.

The habits of some of the Australian birds are very peculiar. Thus the *talagalla*, the brush turkey of the colonists, avoids the personal toils of incubation by depositing its eggs in an immense heap of vegetable matter, and trusts to the heat engendered by the process of decomposition for the development of the young. The heap employed for this purpose is not the work of one pair of birds, but a number labour at the construction for several weeks previous to the period of laying. It varies in size from two to four cart-loads, and is of a perfectly pyramidal form. The materials

are accumulated, not by the bill but by the foot, which firmly grasps a quantity of grass, leaves, and rubbish, throwing the load back to a common centre. When the work is completed, the eggs are deposited, not side by side, but from nine to twelve inches apart, and planted at nearly an arm's depth, perfectly upright, with the large end upwards. They are covered up as they are laid, and allowed to remain till hatched. It is not unusual to obtain nearly a bushel of eggs at a time from a single heap, and, as they are delicious eating, they are eagerly sought after. The *leipoa*, and *megapodius*, are other mound-raising birds. The latter, an inhabitant of the north coast, constructs a mound of vast dimensions, and of different materials, apparently increasing the same every season. One of sand, shells, and a slight admixture of earth, was found to be twenty feet round at the base, and five feet high. In another example, the circumference was sixty feet, and the height fifteen feet. But captain Stokes measured one composed of earth, fragments of coral or stone, and pieces of stick, which had a circumference of a hundred and fifty feet.

More extraordinary still are the bower-like tenements, constructed by the *satin* bird and other species. They are formed of sticks and twigs firmly interwoven, and ornamented with various decorations, being apparently designed to be places of resort; or halls of assembly, where both sexes occasionally meet, and indulge

in giddy playfulness. These bowers are usually placed under the shelter of the branches of some overhanging trees, in the most retired part of the forest. The interior, particularly near the entrance, is decorated with gaily-coloured articles, collected by the birds, such as gaudy feathers and shells, which are either strewed upon the floor, or hung up among the twigs. "The propensity of these birds," says Mr. Gould, "to pick up and fly off with any attractive object, is so well known to the natives, that they always search the runs for any small missing article, as the bowl of a pipe, etc., they may have accidentally dropped in the brush. I myself found at the entrance of them a small, neatly-worked stone tomahawk, of an inch and a half in length, together with some slips of blue cotton rags, which the birds had doubtless picked up at a deserted encampment of the natives. For what purpose these curious bowers are made is not yet, perhaps, fully understood. They are certainly not used as a nest, but as a place of resort for many individuals of both sexes, which, when there assembled, run through and around the bower in a sportive and playful manner, and that so frequently, that it is seldom entirely deserted."

Water-fowl are abundant on the tranquil creeks and silent lagoons along the coast, consisting of wild ducks, wild geese, and the majestic black swan with glossy and exquisite plumage. The frequency of the latter in certain districts disproves the well-known style of

"*rara avis*" applied to it. Its occurrence originated the name of the Swan River, called *Zwanen Riviere* by the Dutch, and *Riviere de Cygnes* by the French. Vast flocks of sea-birds visit the adjacent islands of Australia, among which the *sooty petrel*, better known by the name of "sheerwater," and "mutton-bird," is conspicuous in Bass's Strait for its astonishing numbers. These birds, about the size of the English wood-pigeon, observe a peculiar economy. They are entirely at sea through the greater part of the year ; but at a stated period, towards the close of September, which is observed with great regularity, they come in from the ocean in countless myriads, to establish their rookeries in the islands, the nests being holes scratched in the soil. Having put these old habitations in order by scraping out rubbish, or made new ones, the squadrons put to sea again early in October, and return in about a fortnight to occupy their quarters during the season of incubation. At this period the old birds are captured by man ; the black snake makes havoc with the eggs ; the hawk preys upon the young ; yet, notwithstanding the wholesale carnage, the number of the birds is not perceptibly diminished. The greater quantity are destroyed for the sake of their feathers, two tons and a half of which are said to have been sent from a single locality in a season, the produce of about 112,000 birds, twenty yielding one pound of feathers. From the great length of their wings, the sooty petrels cannot

rise from a level surface. They take flight from the edge of a cliff, or run upon the water, flapping their wings, till, after passing two or three considerable waves, sufficient elevation is gained to enable them to mount into the air. Advantage is taken of this circumstance to capture them, by enclosing certain portions of the islands at night with converging lines of bushes terminating at a pit. At sunrise, when the birds come out of their holes, they are driven towards the pit, into which they fall till it is full. They are also frequently seized in their burrows, though there is some danger of grasping a snake at the bottom instead of a petrel. Flinders computed a flock which he observed at sea to be forty miles long, and to contain as many birds as would require an area of sixteen square miles for their nests, at a yard asunder.

The reptile tribe is represented by harmless lizards, hideous-looking guanas, larger members of the same family, scorpions, centipedes, and snakes. The latter are numerous, and of many species, as well as very varying size. A large kind, called the diamond snake, exquisitely adorned with different colours like mosaic work, has been met with nearly twenty feet long, and is commonly eaten by the natives. Some are so highly venomous, that a bite produces speedy death, unless suction, cauterization, or other remedies are promptly applied. But fatal occurrences of the kind are rare, as all the formidable reptiles are as glad to retire

from the approach of man as he can be to avoid them. The great danger arises from some of the smaller snakes being so exactly similar in colour to the dead sticks and leaves on the ground, that they may be accidentally trodden on while indolently reposing, and inflict a wound before the passenger is aware of their presence. "Whilst plodding forward," says a settler, "now watching the strangely ornamented birds which were flitting about, or talking over our plans, one of my companions, observing at the side of his path a thick piece of stick, struck at it as he walked by ; judge of his surprise as the fancied stick reared itself with an angry hiss and threatening eye ; before it could spring, however, he struck it down, but without killing it ; in another moment, however, the three saplings descended upon and destroyed it ; even in dying, however, the reptile snapped at and fixed its fangs in the stick I held. Finding it dead, I allowed it to remain clinging to the stick, and carried it on with me to the end of our day's journey. Before this we had not given one thought to the possibility of meeting any poisonous reptiles, but our fright made us sufficiently careful, and a wide berth was given to anything which looked suspicious, either in our path or by the side of it." Caution is required when camping out in the bush at night. The unpleasant adventure has occurred of using a saddle for a pillow, and finding in the morning a large black snake, one of the most deadly, coiled

under the saddle-cloth, close to the ear of the slumberer. The warmth of the log-fire had attracted the unwelcome visitor to become the traveller's bedfellow. Frogs abound, resembling in form and size those with which we are familiar, but superbly coloured. The general hue is a vivid yellow-green, but this is pencilled with other shades, emerald, olive, and blue greens, with a few delicate markings of bright yellow, like an embroidery of threads of gold on velvet.

Insect life is intensely prolific, and abundantly annoying in various districts. In the summer, mosquitoes swarm in low situations near water, and in the neighbourhood of thick woods—new-comers being specially exposed to their attacks. Flies are also everywhere a perfect pest, and fleas are often a special torment. There are stingless bees, living in hollow trees, yielding a fine honey; giant ants, called "colonial bulldogs," from their ferocity, which inflict a sting as sharp as that of a wasp; and marsh leeches, insatiably drawing blood as opportunity offers. To guard against these annoyances, strong leathern leggings are commonly worn in travelling on foot through unfrequented parts of the country. The coasts of Australia abound with fish, denominated by names with which we are familiar, as cod, bream, mullet, whiting and mackerel, though of different species. Rock and bed oysters, lobsters, crayfish, and prawns, are also found in various places. The rivers and lagoons have plenty of perch and

eels, with fresh-water shrimps in abundance. The "Murray cod" of the colonists, a beautiful and well-flavoured fish of large size, is caught in considerable quantities at certain seasons in that river.

III. MINERALOGY.

Besides the extraordinary supply of the precious metal, to which a subsequent chapter is devoted, Australia possesses vast stores of mineral wealth, only as yet partially developed. It is commonly believed by scientific men that diamonds will be found in the gold drift, and searchers are recommended to be on the look-out for these not less interesting and valuable treasures. The government geologist of New South Wales, Mr. Stutchberry, has reported respecting the occurrence of several precious stones in the auriferous districts. Though of a size too small to be of value, they may indicate the existence of finer specimens. Topazes, similar to those from the Nova Minas in Brazil, are found in most of the water-courses; garnets occur in the granite ranges; rubies, sapphires, and chrysoberyl, have been met with; chrysolite is common in the form of fine sand in nearly all the gold-washings; and the white transparent rock crystal is general in quartzose districts. The geological surveyor has satisfied himself that native mercury exists, having found specimens of it; and he believes that it may possibly be obtained in quantity—a most important metal in connexion with gold mining.

Native silver in minute and rare spangles has been observed disseminated in primitive greenstone. In South Australia, the gems which make our secondary jewellery are abundant, consisting of jasper and agate, presenting a variety of deep, rich tints. In the copper-mines of that colony, fine specimens have been obtained of the beautiful mineral, malachite, which the Russians manufacture into costly ornaments.

There are immense stores of copper; lead occurs in considerable quantities; and iron of the best kind of ores is abundant, with compact hæmatites, magnetic oxides, bog iron, micaceous, and others, exceedingly well adapted for the manufacture of cutlery. The smelting of these ores must for a period be carried on after the manner of those in Sweden, Carinthia, and Russia, by means of green timber. But, upon the opening of the country by railroad, or other means, when the ore can be carried to the coal districts, or the coal and limestone be brought to the iron mines, then, probably, manufacturing towns may arise on the inland high summit lands, like Birmingham, the highest town in England. The quantity of iron is so immense, that, according to Mr. Stutchberry, if all things else were compatible with its manufacture, there is sufficient to supply another Sheffield for ages to come.

Coal was discovered in New South Wales at an early part of its history. About the commencement of the present century, Mr. Clark,

the supercargo of an East Indiaman, having been wrecked, was driven on shore in a boat at Cape Howe, with some of the crew. In travelling along the coast to Sydney, a distance of three hundred miles, some perished of famine, others were killed by the natives, and three only reached Port Jackson. These survivors reported that in one place, while lighting a fire upon the beach, they accidentally discovered that the black stones strewed around them were coal. About the same time, lieutenant Shortland, having gone northward in pursuit of some escaped convicts, discovered a harbour which he named Port Hunter, round which the cliffs displayed a stratum of fine coal, so close to the water that vessels could load from it without difficulty. A settlement, called Newcastle, was soon afterwards founded at this spot, which has become an important town. This is now the principal coal-field of the colony. The carboniferous formation occupies an extensive area, running northward, westward, and southward, for many miles, and dipping under the sea. It supplies a fuel which burns easily, with a bright reddish flame, and swells and agglutinates, like the English Newcastle coal. In 1847, Dr. Van Sommer, in a geological survey ordered by the governor of Western Australia, explored a vast bed of coal in that colony.

Clay and stone, fitted for the economical purposes of life, are common ; gypsum is found in various places interspersed among the clay or marl ; and roofing-slate may be obtained in

apparently exhaustless quantities. The great sandstone formation of which Sydney is the centre, and out of which the splendid harbour of Port Jackson has been scooped by the hand of the Creator, furnishes fine freestone for building. In that district, lime is procured from vast accumulations of sea-shells on the beach ; but beyond it, northward, westward, and southward, limestone is found in all directions. In certain localities, the limestone passes into marble, valuable for statuary and ornamental purposes. Some of the marbles are finely variegated ; others are jet black, traversed by veins of white calcareous spar ; and others are as close grained and white as the finest Carrara blocks ever chiselled by the sculptor. The general use of beautiful granites and sienites, in the erection of mansions and public buildings, is only prevented by the expense of transit. Kaolin, or porcelain clay, is produced by the decomposition of the granite ; and if potteries were established, there would be no difficulty in obtaining the material for domestic earthenware, or for porcelain of the finest quality. It only remains for the occupiers of the land to be industrious, temperate, frugal, and pious ; and its resources will then be developed so as to promote the happiness and grandeur of the human race, while ministering to "the praise of His glory" who invested the territory with them. "The earth is the Lord's, and the fulness thereof ;" and, while every part of it teems with demonstra-

tions of his power, wisdom, and goodness to fallen creatures, it is their duty and highest interest to mark the Divine hand in them, and employ external things in accomplishing the Divine will.

CHAPTER III.

AGRICULTURE AND HUSBANDRY OF AUSTRALIA.

Disposal of crown land—Australian Agricultural Company—Clearing land—Ploughing, reaping, thrashing, fencing—GRAIN CROPS—Soil—Wheat—Maize—Barley and oats—Subterranean granaries—THE GRAPE VINE—Statement of M. Peron—First Australian cultivator—Vineyards at Irrawang—Best sites—Vineyards at Dunmore—Probable benefits—TOBACCO—Mode of cultivation—MULBERRY TREE and SILKWORM—Adaptation of the climate—COTTON—Cultivated with success—Report of the Manchester Chamber of Commerce—Australian cotton field—FRUITS AND VEGETABLES—Figs—Lemons—Loquats—Melons—Olives—Oranges—Peaches—Allan Cunningham—AGRICULTURAL CALENDAR.

AGRICULTURE commenced in Australia with the arrival of the first British settlers in 1788, when the woodman's axe laid low a portion of the forest, at a spot which received the name of Rose Hill, now Paramatta, at the head of Port Jackson. A government farm was established on the cleared ground, and the seeds, plants, and fruit-trees brought from England, Rio de Janeiro, and the Cape of Good Hope, were speedily thriving, where kangaroos had browsed and natives had hunted. Soon afterwards, all lands being considered the property of the crown, tracts were granted by the local government to whoever wished to obtain them for agricultural purposes, in order to render the

settlement independent of foreign aid for the necessaries of life. Civil and military officers disposed to turn farmers, respectable settlers, and convicts, as a reward for good behaviour, received these grants as free gifts, except that the condition of employing a certain number of convict labourers was sometimes attached to them. In this way some of the best portions of New South Wales, as the fertile districts of the Hawkesbury and Hunter rivers, passed into the hands of private individuals, whose descendants occupy them at the present day. Retired military men, government officials, and clergy, obtained the lion's share; and parties in the mother country, who never passed out of the northern hemisphere, became large Australian landholders, in some instances receiving from ten to twenty thousand acres. The system of free grants continued down to the year 1831, when directions were issued for crown lands to be sold in future at a minimum price of 5s. per acre. This sum was raised to 12s. per acre in 1838, and to 20s. in 1842, at which it has since remained. The proceeds of the sales have been transmitted to the government at home, and devoted to the object of sending out able-bodied emigrants of the humbler class, to supply the demand for labour in these colonies. But very little land has been sold since the minimum price was fixed at 20s. per acre, as cleared farms, with the requisite buildings upon them, are purchaseable at the same, or even a lower rate, from private individuals.

The disposable lands belonging to the crown in New South Wales, Victoria, and South Australia, are divided into the three classes of town, suburban, and country lots. The town lots comprise all lands within the limits of any existing town specially named and described by the governor, or within any locality specified by the governor as the site of an intended town. The suburban lots consist of the land within five miles of the nearest point of the former, unless in any instances where the governor might think fit especially to exclude land from this class, on the ground that it would not derive any increased value from being near the town. The country lots comprise all the land not included in the other two. The sales of land are by public auction, at times and places announced by public proclamation three months beforehand; but country land, having once been submitted to competition, may be disposed of by private contract; yet not under the upset price. In sales by private bargain, the money must be paid down; in sales by auction, a deposit of not less than ten per cent. is required, which is forfeited if the full price is not paid within a month. Formerly, country land could only be obtained in large tracts, seldom less than six hundred and forty acres, except in South Australia; but lots of from thirty to fifty acres are now sold to suit persons of limited capital. Special surveys of twenty thousand acres in parallelograms may be obtained in New South Wales and Victoria with-

out competition. But in both colonies there is an undesirable system of government reserves in operation, by which eligible locations have been kept back from the public, and appropriated to patronized applicants, or are still held to be so disposed of. In the former colony, the Australian Agricultural Company offer land for sale on their estate near Port Stephen, in allotments of all sizes, on advantageous terms. This estate is bounded by the River Manning, intersected by other streams, and provided with roads and bridges, which have been constructed at a cost of many thousand pounds; also churches and schools. Farms and vineyards, which have been long in cultivation, with excellent homesteads attached, are offered at twenty years' purchase on the estimated annual value. The uncultivated land may be had in lots of fifty acres and upwards, at 1*l.* per acre; each 50*l.* paid in England entitling the purchaser to a choice, and a free passage in one of the Company's ships to Port Stephen. Each lot includes a right of pasturage for stock on adjoining land at a low poll tax. Leases are also granted for ten years at 2*s.* per acre per annum, with a right to purchase at 20*s.* per acre during that term. Farms belonging to private individuals are also always in the market, and by treating with them, the purchaser avoids troublesome compliance with the tedious forms required by the government.

In entering upon the occupation of wild uncultivated land, the first operation to be

performed is to clear it of the timber and brush-wood with which it may be heavily or lightly clothed, according to the situation. The early settlers in the parent Australian colony found the country one vast and apparently interminable woodland. Yet in many places it was only thinly covered with trees, there not being more than three or four to the acre, such spots having a park-like aspect. The dense forests and thick jungles were confined to the banks of the rivers, and the alluvial flats visited by their inundations. This is still the character of the region where its natural state has been preserved, with the exception of the interior tablelands, which are open undulating plains. As the quickest mode of clearing the land, and of obtaining a return from it, the trees were merely cut down at about a yard from the ground, and the timber not wanted for any commercial purpose was burned upon the spot. The stumps were thus left standing, dead and naked, to encumber the soil with their roots, giving to the fields a most unsightly appearance, that of a grave-yard studded with uninteresting and unmeaning monuments. This plan of clearing has been largely persevered in, though a serious impediment to good husbandry. The remains of the trees are perpetually in the way of every operation. They arrest the progress of the plough and harrow, occasion the breakage of implements, and the neighbourhood not being tilled, becomes a nursery for noxious weeds. When capital can be commanded, the more

expensive but effectual mode of uprooting the timber is adopted. This process is most conveniently performed in winter, when the ground is moist and soft, and strong winds prevail. A single labourer will effect more in that season than three in summer, when the soil is hard and the weather calm.

Agricultural operations were long conducted in the roughest style and with the rudest instruments. This primitive stamp has been largely retained, though there are many cultivators of intelligence and means who proceed on scientific principles, with the best English improvements. On half-cleared land, ploughing is a difficult process, owing to stumps, stones, and roots. Wooden ploughs answer the best, drawn by a team of oxen. They can be readily lifted over impediments, and repaired if broken; while oxen are cheaper, more easily fed, and go more steadily than horses. Reaping is performed by simply cutting off the ears of corn, leaving the stalks to be ploughed in or burned off, straw being of very little use to an Australian farmer. Straw-yards are altogether unknown, as the cattle are throughout the year depastured on the soil. Thrashing is effected in almost every style, from the primitive mode of treading out, to the operation of the flail and best thrashing-machines. Land is enclosed with fences, uniformly constructed of wooden posts and rails, as in British America. The employment is followed by a distinct class of labourers, who travel about the country, and

execute their work at so much per rod. These enclosures are put up with great neatness, but have a very unornamental appearance, in comparison with the hedgerows with which we are familiar. Attempts have been made to naturalize the hawthorn, but it degenerates in the climate of New South Wales, loses the bushy character, and becomes a slender delicate plant without thorns. The aloe used for fencing in Sicily, and a species of acacia from India, have been recommended as substitutes; but habit has reconciled the colonists to the post and rail system, and timber being abundant, economy is preferred to beauty.

The principal objects of cultivation, with some to which the soil and climate are adapted, include the varieties of grain, the grape-vine, tobacco, the cotton plant, the mulberry for silkworms, and almost all kinds of fruits and culinary vegetables.

I. GRAIN CROPS.

The preponderating soils of Australia, compared with the virgin soils of Canada, the United States, and many other countries, are found by chemical analysis to be greatly inferior in the amount of salts and alkalies they contain, and consequently in natural fertility. In situations exposed to the wasting effect of atmospheric influences—floods, droughts, winds, and other local causes—the soil is impoverished, and yields only pasture for grazing purposes. But other sites, which receive the drift and

diluvium carried from the former, are rich lands, especially applicable to agriculture. Some of these tracts are astonishingly productive. Wheat, the most important article of agricultural produce, has been yielded during several years in succession, without any manure, at the rate of from thirty to forty bushels per acre. South Australia produces fine and heavy crops of wheat, and in some districts, from thirty to thirty-five bushels an acre are considered a low average. It has been pronounced in our House of Lords the finest in the world, and the statement is justified by the price obtained in the market. South Australian wheat has been sold in Mark Lane at 76s. per quarter, when the current price of good English wheat was about 60s., and some samples sent home for seed realized 96s. But with some exceptions, that of New South Wales is of an inferior kind. The grain has deteriorated under improper treatment of the land. It shows a much greater per centage of husk or bran, and a much smaller amount of the azotised principles of gluten and albumen, than that originally imported into the colony, and that of the other corn-growing countries. The following illustrative table is abridged from the one drawn up by Strzlecki:—

LOCALITY OF THE WHEAT.	Average per cent. of Gluten.
Europe.—England, Bavaria, Sicily, France, Prussia, Poland	22·5
Asia.—Turkey, East Indies, Arabia, Russia	21·6
Africa.—Egypt, Cape of Good Hope	22·0

LOCALITY OF THE WHEAT	Average per cent. of Gluten.
North America.—Canada, United States, Mexico	21·3
South America.—Brazil, Argentine Republic, Chili	17·9
Australia.—New South Wales—highest . . .	16·0
" " " lowest . . .	4·0

Neither the soil nor the climate is in fault. The degeneration is the effect of the pertinacity with which crop after crop has been solicited from the same land, without intermission or rotation, and with little aid from manure to restore the elements of fertility in continual process of exhaustion. A change of the seed of wheat, and a change of system, are alone required to remedy the evil.

Maize, or Indian corn, a fine and productive grain, of a most luxuriant appearance in a growing state, is the next important cereal cultivated, supplying the struggling settler with an invaluable crop. It is chiefly grown as food for horses, swine, and poultry ; but mixed with an equal quantity of wheaten flour, it may be made into a wholesome bread for man, much superior to the preparation of oatmeal used by our northern peasantry. While green, it becomes by boiling a delicious vegetable for the table. Maize is usually the first crop which the settler raises from his cleared land, and as it is reaped in May or June, there is just sufficient time left to enable him to sow the same land with wheat, and thus reap two crops within six or seven months. It requires a very strong soil, and is best raised on the alluvial tracts

which line the rivers. In planting maize, shallow holes are made with a hoe, about three feet apart, and in rows of about six feet distance; four or five grains are dropped in each, and covered up, vegetation quickly appearing at the surface, and proceeding with great rapidity, if the season is moist. Newly-sown fields require to be watched at night, if trees are near, otherwise the opossums and bandicoots will scratch up the seed, and feast themselves with it. At a proper stage of growth, the plants require to be hilled up with a considerable quantity of earth. A field of maize has a very beautiful appearance. The corn-stalks, six or eight feet high, terminate at the top in what is called a *tassel*, which waves down the rows like a grenadier's feather in the breeze. It bears on the lower part two, three, or four cobs or heads of corn, each enclosed in a thick casement of leaves, and springing obliquely from the stalk. Cucumbers and water-melons may be grown between rows of maize.

Barley and oats, the original products of cold climates, are cultivated to some extent; the former chiefly for brewers and distillers; the latter exclusively to be cut green, and made into hay for stable horses in the principal towns. Large quantities of oaten hay are sent weekly into Sydney market.

The plan has been adopted by some agriculturists in New South Wales, of constructing *silos*, or subterranean granaries, for the storing of cereal produce. Security against destructive

insects and vermin, decomposition and decay, with the equalization of the supply of corn, by keeping the superabundance of one season to meet the deficiency of another, are the purposes in view. The last-named object is not of so much importance at present as formerly, when the limits of the colony were contracted, its resources scanty, and no neighbouring colonies existed to help in time of need. Seasons of scarcity were then severely felt. Among the southern nations of Europe, in the Barbary States, in Hungary, Poland, and some parts of Russia, the storing of grain in pits sunk in the ground has been customary from time immemorial. It was also the practice of the ancient Gauls; and excavations for this purpose are still in existence at Amboise, in a bed of rock. Several instances have occurred in Spain, of the accidental discovery of subterranean stores of grain in good preservation, of which there existed no recollection, but which had probably been established by the Moors, while they were lords of the soil. An elevated site is fixed upon for such constructions, if possible the pinnacle of a small mount, so that there can be no drainage of water into the granary from higher ground in its vicinity. A pit is sunk, resembling an inverted limekiln, the depth and dimensions of course depending upon the quantity it is required to contain. Silos have been constructed at Camden, on the estate of Mr. M'Arthur, one of which, filled with maize and millet, was opened after the expiration of six

months, and the grain found in excellent preservation. They have also been excavated out of the sandstone rock at Cockatoo Island, of sufficient capacity to contain six thousand bushels of wheat.

II. THE GRAPE VINE.

M. Peron, a French scientific voyager, who visited the southern hemisphere about the commencement of the present century, observed, in an account of the expedition, that Great Britain was then the only one of the great maritime powers which did not cultivate the vine, either in her own territories or in her colonies, but was entirely dependent for wines upon foreign nations. Having visited Australia, however, he perceived its capability to become a wine-producing country; and announced it as probable that such produce would be eventually returned to the parent state from the southern dependency. The anticipation has been realized. Almost all the varieties of the grape vine are now in regular cultivation in New South Wales, Victoria, and South Australia, especially in the former colony, and, both for raisins and for wine, the experiment has answered remarkably well. It would be difficult to find a climate better adapted for the culture, or soils more suitable than those of the maritime lands on the eastern coast. The first successful cultivator was Mr. M'Arthur, at Camden, who may be called the founder of the prosperity of Australia, as having intro-

duced the first fine-woolled sheep. Some Greek prisoners, transported for piracy from the Ionian Islands, having been assigned to him, were employed in cultivating a vineyard after the Greek manner. Upon the expiration of their sentences, they were succeeded by some German families from the vine-growing districts of the Rhine, who were brought out at the cost of the proprietor. Other settlers imitated the example; hundreds of varieties of vine-cuttings from France and Spain have been imported; experienced cultivators have been obtained, chiefly from Germany; vineyard associations have been formed; and in 1850 there were twelve hundred and thirty-two acres thus employed in New South Wales and Victoria, which provided upwards of one hundred and fifteen thousand gallons of wine, and two thousand two hundred and forty-four gallons of brandy.

Mr. King, of Irrawang, on William's River, in a letter to earl Grey, September 26, 1849, thus detailed his experience and success as a vine grower: "In August, 1832, and the following year, I planted in this colony an experimental vineyard, of a few acres' extent, with vine-cuttings of the most approved varieties which I could then procure, consisting of about six thousand plants. The soil, the debris of pudding-stone and porphyry, was trenched, broken, and turned over with the spade to not less than thirty inches deep. The vines grew vigorously; some of them produced fruit abun-

dantly; and all now in the vineyard are in good health. I rooted up such varieties as did not perfect their fruit, or were in any way liable to be materially injured by the peculiarities or vicissitudes of the climate. I planted, in 1834, a greater variety of sorts, many of which had shortly before been imported from France by Mr. Busby, to whom the colony is consequently much indebted. When they came into bearing, I was thereby enabled to select those particular varieties which appeared to be best suited for this climate, as many of the kinds were unfit for cultivation in the colony, at least in this part of it. The sorts so selected were planted more extensively; and the samples of wine now submitted to your lordship's examination are the result. The process followed in the manufacture of the wine is so simple, that it need scarcely be mentioned. From the experience thus acquired, as to the capabilities of this colony for the production of wine, I have no hesitation in predicting that New South Wales will yet become a wine-growing country on a very extensive scale, and be enabled profitably to export its vinous products all over the world. Even the time required for its transit from this to Britain, or to any other distant market, is less a consideration than with any other species of merchandize, since wine will be improving on the voyage, and even more rapidly on ship-board than in the cellar. The soil and climate of this colony are calculated to produce wine of superior

quality, and that to an almost unlimited extent."

The best sites for the vine are the sides of gently sloping hills, sufficiently elevated above the valleys or plains to be beyond the influence of hoar-frosts in spring, and the chill humid exhalations occasionally prevalent in such situations. The first not unfrequently frustrate the hopes of the cultivator in a single night by cutting off the young shoots; and the last greatly retard the vintage. Experience in this branch of colonial husbandry shows, that a vineyard on the side of a hill, at an elevation of a hundred or a hundred and fifty feet, will usually be three weeks or a month more advanced than one planted in a valley or plain at its foot. The Germans on the Rhine so value sites of moderate elevation, that they form them by carrying up baskets of earth to natural terraces of rock. Shelter from the hot winds and strong westerly breezes are requisite in Australia; but it is not necessary to select a specially sunny aspect, as the long sunny days and the long summers are amply sufficient to bring the fruit to maturity. A volcanic country is favourable to the vine, as the trap formation of Hunter's River, which is at present the principal seat of its cultivation. In this district there are flourishing vineyards, not on the slopes of hills, but on alluvial deposits beside the streams, composed of trap debris. The vineyard at Dunmore, belonging to Mr. Lang, which has acquired some celebrity for its

extraordinary produce, occupies a situation of this kind on Paterson's River. It comprises about eight acres, and is laid out in the German style, under the superintendence of a Wirtemberger. Walks crossing each other at right angles divide it into four compartments; in the centre, where the two principal walks intersect, is the *lusthaus*, or pleasure-house of the Germans, a circular harbour of trellis work, covered with vines, forming an agreeable shade from the hot summer's sun. "Five thousand vines, cultivated after the gooseberry-bush fashion in rows, may be planted on one acre of ground, and will produce five hundred and sixty gallons, or five pipes of wine. But a more beautiful appearance may be produced by training them over trees in the Italian style, in festoons, or over a walk in lofty frames. What a picture such an avenue might present, all green and purple and golden, with pendant bunches, and alive with thieving, brilliant-plumaged birds, lories, parroquets, and cockatoos!"

There is no reason why thousands of Australian settlers should not sit literally under the shadow of their own vine, have a plot of their garden ground devoted to its culture, and manufacture for domestic consumption a wholesome, refreshing, but not inebriating beverage. Labour is the chief expense, and great part of the work may be performed by women and children. The employ is often socially beneficial, as it tends to keep families together, engaged in a profitable task. Three generations

are frequently seen occupied simultaneously in vine-growing lands—the child, the mother, and the grandame. It is anticipated, also, that the production of light wines will induce habits of sobriety, and improve the morality of the Australians, by superseding largely the consumption of ardent spirits. This has hitherto been the bane of the colonists; and a fearful scourge in the misery it has inflicted, and the crime it has originated. But communities of wine-producers are rarely intemperate in using the produce of their own vineyards, and are prevented by the use of it from being addicted to spirit-drinking. It was correctly remarked by president Jefferson, that “no nation is drunken where wine is cheap; and none sober, where the dearness of wine substitutes ardent spirits as the common beverage.”

III. TOBACCO.

A wild indigenous species has been observed in several localities. The cultivated plant is raised with great success on the lowlands of the east coast, and the alluvial tracts on the banks of the interior rivers are equally eligible situations. It bids fair to become an important article of colonial produce, and to be a valuable object of culture to the small settler. The tobacco seed is sown about the middle of July, saved from the crop of the preceding year. Sowing is continued at intervals until October, in order to secure a succession of beds of plants, as the first are liable to be destroyed by insects.

The ground is kept moist, and during the process of germination, other land is prepared to receive the young plants. They are carefully dug up when of small size, the roots preserved entire, transplanted on a rainy day, and kept shaded from the blaze of noon. Planting goes on generally from the close of September to the end of the year. The cultivator has to clear away dead leaves, remove suckers, and guard against the ravages of insects. When the leaves are mottled with yellowish or golden patches, they are then ready for plucking, which happens in February, March, or April, according to the time of planting and the season. The entire plants are cut down a little above the ground, and hung up to dry in dark sheds, from which the external air is excluded as much as possible. When dry, the leaves are pulled off, the stalks being thrown away as useless. At this stage the growers sell their produce to the merchant, who prepares it. One ton from an acre is sometimes obtained, and sold from 50*l.* to 70*l.*, according to the quality. In 1850, New South Wales had five hundred and ten acres of land under tobacco cultivation, of which the produce was 4,923 cwts.

IV. THE MULBERRY TREE AND SILKWORM.

It has been decisively proved that the climate is highly congenial to the silkworm, which thrives, and produces a first-rate article. It is equally favourable to the mulberry, supplying the silkworms' proper food, the growth of which

may be indefinitely extended. The general cultivation of the tree at an early period is confidently anticipated, with the production of raw silk. The opinion has been expressed, that it may answer the purpose of small proprietors or tenants to cultivate the mulberry for the sale of the leaf alone ; or, that landed proprietors may grow the tree to supply tenants with the leaf to rear silkworms upon. In the latter case, as in Italy, the tenant would find the labour for attention to the insects, and gathering the leaves, to which young children are competent ; the landlord would provide the leaf itself and the necessary ground on which to grow it ; and the two parties divide the cocoons between them when brought to maturity. Mr. Montgomery Martin recommends the introduction of a peculiar species of mulberry which grows near Nankin, and in the regions bordering the great River Yangtse-Kiang, which is found by the experienced Chinese to produce the finest silk. The neighbourhood of Port Stephens and Port Macquarie, he states, ought to be among the most productive silk countries in the world.

V. COTTON.

A wild species is found growing very luxuriantly in some parts, and the plant flourishes highly under cultivation, but whether it can be made to pay as produce remains to be determined. The cotton trees are in some instances nine feet high, bearing a hundred and fifty pods. From the neighbourhood of Sydney northwards

along the coast, excellent specimens of the product have been obtained. In July, 1852, our daily journals contained the following account of nine samples :—

“ Some specimens of cotton grown in Australia have been submitted by the rev. Dr. Lang to the examination of Mr. Thomas Bazley, president of the Manchester Chamber of Commerce; and the opinion of this gentleman, who is acknowledged to be a first-rate judge of the qualities of cotton, will be read with great interest, as showing that this quarter of the world gives promise of becoming one of the finest cotton fields which have yet been discovered in our colonies, if not, indeed, in the world. The samples of cotton were accompanied by the following schedule, giving a brief history of each description of cotton :—

“ 1. In the small canvass bag grown by Dr. Hobbs, of Brisbane, Moreton Bay, in latitude 27°, from seed labelled Owen's Superior. The locality is on a tide river, about fifteen miles from the sea.

“ 2. Small specimen of cotton in the seed, grown at Ipswich, on the Bremer River, a tributary of the Brisbane, about forty miles from the sea, in the same latitude.

“ 3. A small specimen of Big Cream cotton, grown by the rev. Mr. Gibson, formerly of Jamaica, now of Clarence River, in latitude 29½° south.

“ 4. Another specimen from Mr. Gibson's plat,

in the seed. Mr. Gibson considers it admirably adapted to the soil and climate.

"5. Also grown by Mr. Gibson, Clarence River, from different seed.

"6. From Dunmore, Hunter's River, latitude $32\frac{1}{2}^{\circ}$, grown by A. Lang, Esq., J.P.

"7. Small specimen of the seed, from the same river, opposite side, grown by Mr. Scobie.

"8. Grown by J. Bucknell, Esq., Patterson's River—the second year's crop from the same plants. They stand the winter quite well; and Mr. Bucknell says the yield is finer and more abundant the second year than the first. The Patterson is a tributary of the Hunter, in latitude $32\frac{1}{2}^{\circ}$.

"9. An additional specimen from Mr. Bucknell's, in the seed."

"The following is Mr. Bazley's answer, as submitted through the Secretary of the Chamber:—

"CHAMBER OF COMMERCE AND MANUFACTURES.

"Manchester, July 15, 1852.

"REV. SIR,—I have submitted the samples of Australian cotton sent by you to the Chamber yesterday, to the criticism of our President, Thomas Bazley, Esq., whose knowledge and judgment in such matters are not surpassed by any gentleman connected with the trade. He has instructed me to make the following report thereon, according to the numbers adopted in your schedule:—

"No. 1. Grown by Dr. Hobbs of Brisbane:

excellent cotton, and in perfect condition for the spinner ; value 22*d.* per lb.

“ No. 2. Grown by Mr. Douglas of Ipswich : really beautiful cotton ; worth, if perfectly cleaned, 2*s.* per lb.

“ No. 3. Grown by the rev. Mr. Gibson, Big Cream : very good cotton, but not well got up ; worth 21*d.* per lb.

“ No. 4. Grown by the same : very excellent, and in good condition ; worth 23*d.* per lb.

“ No. 5. Grown by the same : excellent cotton ; worth 22*d.* per lb.

“ No. 6. Grown by A. Lang, Esq. : short stapled cotton, of the New Orleans class ; worth 5½*d.* per lb.

“ No. 7. Grown by Mr. Scobie : good cotton ; worth 20*d.* per lb.

“ No. 8. Grown by J. Bucknell, Esq. : good and useful cotton, but of the common Sea Island class ; now worth 18*d.* per lb.

“ No. 9. Grown by the same : like the preceding ; worth 17*d.* per lb.

“ I am further instructed to assure you, that in the preceding estimates Mr. Bazley has been careful to keep within the limits which his own appreciation of their worth would have led him to fix ; and I am to express his opinion that such superior and excellent attributes of perfect cotton have been rarely seen in Manchester, and that your samples indisputably prove the capability of Australia to produce most useful and beautiful cotton, adapted to English mar-

kets, in a range of value from sixpence to two shillings and sixpence per lb.

“I am, rev. Sir,

“Your most obedient servant,

“THOS. BOOTHMAN,

“*Secretary.*”

This report is decisive respecting the capability of Australia to produce cotton suited for the manufactures of the mother country. Whether it can be grown, so as to remunerate the grower, and compete with Transatlantic produce in the home market, is a problem which remains to be solved. It is highly desirable that the experiment should be fairly and fully tried, since at present, according to a common saying, “slavery sits on a cotton bale.” The Moreton Bay district, in the north of New South Wales, with the basins of the Tweed, Richmond, and Clarence Rivers, is the locality best adapted for the culture. It has been styled the future cotton field of Great Britain. The region has extensive tracts of great fertility and value, adorned with splendid vegetation of a tropical character, with a climate suited to the European constitution, so as to admit of almost any kind of labour being performed. The heat in summer on certain days is indeed intense, the thermometer sometimes rising to 109° in the shade ; but these hot days are only occasional, and generally terminate in hail or thunder-storms, with southerly winds, when the air becomes cool and delightful. Ordinarily the weather is bright and spring-like,

while the never-fading mantle of green which perpetually clothes the country, shields the inhabitants from those ophthalmic diseases so prevalent in other quarters. Besides cotton, indigo, and coffee, the sugar cane might be cultivated. A resident of four years bears testimony to the salubrity of the district, and affirms that no country ever came from the hands of its Creator more eminently qualified to be the abode of a numerous and thriving population.

VI. FRUITS AND VEGETABLES.

Some of the common fruits of England and northern Europe—the apple, cherry, plum, gooseberry, currant, raspberry, and strawberry—are best produced on the high grounds, the cool parts of Australia.

Almonds thrive remarkably, ripening in February.

Apricots flourish almost everywhere, chiefly as standards, and are in great abundance.

Bananas grow in northerly positions, on the sea-coast, in sheltered situations. At Moreton Bay, products widely apart in their native sites have been seen in the same garden, bananas and turnips, sugar-cane and cabbages, pine-apples and potatoes.

Figs are generally diffused, yielding two crops in the year, without any trouble except that of planting. The fruit is abundant in quantity, and of the finest quality, likely to become a valuable article of export.

Filberts are of a size and flavour unsurpassed.

Lemons flourish, either as standards or as hedgerow bushes, and have long been common.

Loquats, a Chinese fruit, growing on a highly ornamental tree, are found in most gardens. The large-leaved magnolia-like loquat has a beautiful appearance, whether laden with its pendant clusters of fragrant blossoms, or their succeeding bright amber plums.

Melons, water and sweet, are in great abundance and of large size, growing almost wild. Nothing is requisite but to throw the seed into the ground. Farmers scatter a few seeds with their corn, and obtain a luxuriant produce, each sometimes twenty lbs. and twenty-four lbs. in weight.

Olives, though not cultivated to any extent, are capable of being grown generally wherever the vine yields well. The tree will occupy an important place in Australian husbandry, from its commercial value.

Oranges arrive at great perfection in New South Wales, and are sent in large quantities to Victoria and Van Diemen's Land, where they cannot be grown. Numerous and extensive orangeries or orange-groves surround Paramatta, and line the banks of the river for some distance towards Sydney. The large trees, gay with their golden fruit and exquisitely fragrant bridal-blossoms, are among the noblest of all the acclimatized products of Australia. The long warm summers suit the orange. In

favourable situations, the trees rise to the height of twenty-five feet. The most celebrated orangery, belonging to Mr. Suttor, near Paramatta, is one of the sights of Sydney. It was commenced in 1801, with three plants brought by colonel Paterson, lieutenant-governor, from Salvador, in 1799. Some of the trees are half a century old, thirty feet high, and are not yet at full bearing. One has yielded a hundred dozen of oranges, some of the fruit being ripe all the year round. A single avenue exceeds a quarter of a mile in length, and forms a magnificent promenade, the dark green foliage of the trees on each side finely contrasting with the bright yellow produce. Twenty thousand dozens of oranges are frequently procured in a single season from a plantation, and the fruit of three acres has brought fifteen hundred pounds sterling to the proprietor. The mandarin orange, a celebrated Chinese kind, is said to be better at Sydney than at Canton. The tree is an elegant dwarf species, with fruit as small as an Orleans plum, of a fine dark yellow colour, remarkable for a highly perfumed rind, not thicker than brown paper.

Peaches are so plentiful that the farmers feed their pigs with the windfalls of their teeming orchards. Nothing can surpass the excellence of a peach ripened in the brilliant sunshine of Australia. The yield is remarkable for quantity, as well as for the comparative size of the fruit. A basketful may be purchased for a trifle in the Sydney market.

Peaches are now frequently met with wild in the woods, and yield a wholesome refreshment to the weary traveller, the more valued, as the native forests afford nothing whatever in the shape of fruit for the sustenance of man. If a peach-stone is planted in the ground, in any part of the country where some supply of moisture is obtained, there will be a tree laden with fruit in three or four years, without any kind of culture. Bushrangers have thus planted the stones; birds have dropped them; and removed, in some measure, the reproach of barrenness from the wild land. In grateful remembrance of the refreshment thus met with in his wanderings, and for the benefit of future travellers, and also the aborigines, the unwearied explorer, Allan Cunningham, always carried about with him, in his expeditions, a bag of peach-stones, which he carefully planted in the sterile wilderness. "I was much struck with this circumstance," justly remarks a relator of it, "and while I could not help commending, from my very heart, the pure and disinterested benevolence it evinced, I could not help inwardly regarding it as a lesson for myself in the future, and a reproof for the past. Alas! how many spots have we all passed unheeded in the wilderness of life, in which we might easily have sown good seed if we had so chosen, and left it to the blessing of God, the dew of heaven, and the native energies of the soil! Such spots we may never revisit; and the opportunity of doing good, which was thus afforded us, but

which was suffered to pass unimproved, will consequently never return."

All the important culinary vegetables which appear in European domestic life are raised in great, and many in far greater, perfection in Australia ; and with reference to some of the more valuable, they may be sown or planted at any time of the year, and will yield good crops.

VII. AGRICULTURAL CALENDAR.

The distribution of agricultural labour and farm management throughout the year is just the reverse of that which is customary in England. A sketch of the calendar, derived from the valuable pages of Strzlecki, may be given.

The month of January, in New South Wales, corresponds, as regards season, with the month of July in European latitudes ; but as regards agricultural occupations, it corresponds with August. Thus, in that month, the reaping and getting in of the wheat harvest is brought to an end ; the wheat is thrashed, and the farmer gathers the stubble of the early maize, ploughs the land for the next wheat crop, and weeds the potato fields.

The February of Australia, which is the August of Europe, is the month in which the barley-harvest and the sowing of the turnips begin ; while the ploughing of the land for the next wheat crop, and the clearing of the potato fields, continue. In New South Wales, since the introduction of the tobacco plant, the month

of February is also the proper time for cutting and drying the tobacco leaves.

Towards the end of March, which is the September of Europe, the farmers commonly secure all their maize crops, the stubble of which is, in the north of New South Wales, sometimes ploughed in for wheat. The sowing of turnips also continues.

In April, which is the same as our October, the gathering in of the maize still proceeds, and the sowing of the wheat begins. The second cutting of tobacco is likewise commenced. In this month the potatoes are usually dug up, and partly stored.

The month of May, corresponding to the November of Europe, allows the farmer of New South Wales to proceed with and bring to a close the sowing of his wheat. The cutting of tobacco and the gathering of maize is completed, as is also the storing of potatoes.

June, the midwinter, or December of Europe, is employed in sowing the latest wheat, clearing the maize land of the stubble, and in thrashing out the corn.

July, the January of Europe, is the month in which the farmer prepares the land for early maize, tobacco, and potatoes.

August, the February of Europe, is commonly devoted to preparing the land for spring crops, and, in the north of New South Wales, to planting potatoes.

September, the European March, is the time for sowing spring wheat and barley, and, in

some parts, artificial grasses. In this month a general planting of maize and potatoes takes place, and turnips are removed.

In October, the April of Europe, the farmer completes the planting of maize and potatoes, and prepares the land for tobacco. In November, the May of Europe, the wheat harvest in the northern parts of New South Wales begins. The ploughing and preparing land for the early maize follows, as also the making of hay.

December, the June of Europe, is the month of general harvest. The clearing of the September maize and potato fields is attended to, as also the topping of the tobacco, and the planting of new maize.

The wealth of the Australian continent, and the resources to be depended upon by the colonists, must be looked for, not in its auriferous stores, but in its pastoral and agricultural capabilities, with its useful minerals—in short, in all the products which repay the patient assiduity of continuous toil, rather than satiate the cravings of ravenous cupidity. But not a few have gone to its shores, unaccustomed to any kind of drudgery, expecting prosperity to attend them in the new region in some easy undefined way, and the command of competence to be secured with scant experience of toilsome application. The consequence has been bitter disappointment, with the loss of whatever means were taken out. Especially in agriculture, the small capitalist cannot succeed, unless willing and able to

take axe on shoulder, plough in hand, and stoop to any and every kind of work. Nor will the large absentee capitalist probably find land cultivation a profitable pursuit. "But," says Mrs. Chisholm, a very competent authority, "from my own personal experience in hundreds of cases, I know that it does pay the working farmer. I have seen English, Irish, and Scotch improve their circumstances by getting on a farm, and I have evidence to prove it from the people. True, my experience has been chiefly confined to the working man; and I never visited their farms, or saw them, without observing some proof of improved circumstances. I am therefore quite certain that any man of industrious habits can do well on a farm, improve his condition, and rear his children in respectability, as many hundred voluntary statements collected by me will prove." While possessing vast tracts doomed to hopeless sterility, and singularly devoid, everywhere, in its native state, of the vegetable productions that are important to the sustenance and comfort of civilized man, there are immense spaces in Australia where cultivation will reward labour, and industry be crowned with an adequate recompense. If not naturally answering to the inspired description of another country, it may, through no inconsiderable extent, be made by human instrumentality to do so, and already is becoming "a land of wheat, and barley, and vines, and fig-trees, and pomegranates; a land of oil olive, and honey; a land wherein thou shalt eat

bread without scarceness, thou shalt not lack any good thing; a land whose stones are iron, and out of whose hills thou mayest dig brass."

CHAPTER IV.

SHEEP AND CATTLE FARMS OF AUSTRALIA.

First live-stock landed—Extraordinary multiplication—English and foreign wool—Mr. M'Arthur—Camden estate—Australian wool—SHEEP RUNS AND SQUATTERS—Land arrangements—Native grasses—Burning the grass—Squatting life—Its primitive rudeness—Improvement—OUT-STATIONS—Their economy—Dampers—Shepherds—Watchmen—Dogs—Wages—BUSY AND ANXIOUS TIMES—Lambing season—Sheep-washing—Sheep-shearing—Disposal of the produce—Diseases of flocks—CATTLE STATIONS—Stockmen—Habits of cattle—The stockman's horse—Mustering and branding—BOILING-DOWN—Origin of the system—Revolt scenes—Ox-hide—A boiling-down establishment—Waste of food—Future of Australia.

Few things are more remarkable than the extraordinary multiplication of the domesticated animals in Australia, originally destitute of all those species best adapted for human sustenance and the economy of civilized life. The squadron which conveyed the founders of its colonisation to the shore, emphatically styled in local records the "first fleet," landed a mere handful of live-stock sixty-five years ago. After about four months, a formal return of the number gave the following items:—7 horses, 2 bulls, 5 cows, 29 sheep, 19 goats, 74 swine, 5 rabbits, 18 turkeys, 29 geese, 55 ducks, 142 fowls, and 42 chickens. Some of the sheep were killed by the native dogs; others died through eating unwholesome herb-

age; six of the cattle escaped into the woods; and a fresh cargo sent out was lost at sea, owing to the ship striking on an iceberg off the Cape. The stray cattle largely increased; and, after some years, the wild drove was found in a fine district near the Nepean River, about forty miles from Sydney, which has since retained the name of the Cow Pastures from the circumstance. The first knowledge of its existence was obtained in a singular manner. Some of the aborigines from the south-westward, coming to the neighbourhood of the settlement to attend a grand *corobbery*, so exactly imitated the bellowing and butting of the strange animals they had encountered, as to enable the settlers to identify their lost property. The herd remained unmolested for many years, but it was finally destroyed by order of the government, being of a very inferior breed, and annoying proprietors by mixing with and deteriorating their cattle. At the commencement of the present century, the thirteenth year of the colony, after trying difficulties and severe privations had been endured by the colonists, their live-stock stood as follows :—

Sheep.....	6,124
Cattle.....	1,044
Horses.....	203
Swine.....	4,017
Goats.....	2,182

After the lapse of half a century, similar statistics of recent date strikingly contrast with the above :—

	Sheep.	Cattle.	Horses.
New South Wales	7,026,000.....	1,360,100.....	111,200
South Australia	1,200,000.....	100,000.....	6,000
Victoria	6,033,000.....	346,562.....	16,748
Total.....	14,259,000	1,806,662	133,948

Including Western Australia and Van Diemen's Land, there must be upwards of twenty millions of sheep in these colonies. But the above figures are very far from expressing the full multiplication, as immense numbers have been killed for food, cut off by accident, and slaughtered to be boiled down for tallow. In the single year 1849, there were not less than 743,000 sheep, and 45,000 head of cattle, disposed of in the last-named way.

The production of woollen fabrics, at present one of the great staple manufactures of Great Britain, is also the oldest. The early and universal domestic use of the native wool is shown by the name of "spinsters" applied to unmarried women in our legal documents. The term has been in use from time immemorial, and is indifferently employed to designate the noblest and the humblest in the land. The phrase, "spindle-side," in relation to female descent, is as old as the day on which Alfred dictated his will; and the denomination of the "woolsack," so constantly applied to the presiding place in our House of Lords, illustrates the value attached to the commodity by our ancestors, as well as the use made of it. Down to a comparatively recent period, fleeces of home growth were probably as fine as any of foreign

production. But the rise of a new system of husbandry to improve the flesh, and increase its bulk, by artificial food, deteriorated the quality of the wool, rendering the staple longer and the fibre larger. It became unsuited for purposes extensively demanded by the manufacturer; and hence as soon as the import duty on foreign wool was so far lowered as to admit of commercial dealings, a gradually increasing proportion of foreign produce was introduced. The finest fleeces were formerly obtained from Spain, of which the best cloths were made. But the Spanish merinoes being imported into Saxony and other parts of Germany, wool from that quarter took the lead in meeting the demands of the English market. Australia has now established a new source of supply; and the article thence obtained, in respect both of quality and price, is so advantageous to the clothier, that an enormous quantity is annually brought to our shores, giving employment to a fleet of shipping. Twenty years ago, the supply did not amount to one-tenth part of the total amount imported; but in 1850, it was as follows:—

Wool Imported.	
From Spain	440,751 lbs.
Germany	9,166,731
Other European countries	8,783,666
South America	5,996,648
Cape of Good Hope	5,709,529
East Indies	8,473,552
Australia, Tasmania, New Zealand	39,018,991
All other parts	2,487,790
Total.....	74,326,779

It may be stated in a general way, that at present English wool is chiefly used in the production of worsted fabrics; Saxon wool, in the manufacture of the best cloths; and Australian wool, in the great bulk of our woollen goods, with the beautiful fabrics known as Indianas, Merinoes, and Challis.

The primitive Australian sheep were of the Bengal breed, a very unsightly race, covered with long coarse hair, resembling the goat in appearance. But the soil and climate worked wonders on them. In two or three generations, without any admixture of blood, the hair was completely gone, and a fleece succeeded, though of no great fineness. The stock improved more decidedly by crossing with breeds from the mother country, South-Downs and Leicesters. About the year 1793, lieutenant-general Grose, influenced by the severe distress that had prevailed throughout the colony, considered it expedient to promote cultivation by giving grants of land to the civil and military officers under his command. Among the persons so encouraged was John M'Arthur, then captain of a regiment, a man of far-seeing views, great energy, intelligence, and courage. He resigned his commission, devoted himself to agricultural pursuits, and some years after obtained three or four Marino sheep, imported from the Cape of Good Hope, to which place they had been sent from Europe, as a present to the Dutch governor. Conceiving the climate to be admirably adapted to the growth of fine wool,

Mr. M'Arthur was induced to pay particular attention to the crossing and increase of this breed of sheep. In 1804, he visited England, and a few specimens of the wool raised by him were accidentally seen by a committee of manufacturers of woollen cloth, then assembled in London. After making inquiries, they expressed a decided opinion that the colony of New South Wales would, with proper management, be enabled to supply the manufacturers of the country with a great portion of the fine wool which was then with difficulty obtained from Spain. Attaching much importance to this object, their opinions were communicated to the government by memorials; in consequence of which, Mr. M'Arthur was directed to attend the privy council, before whom he was examined as to the state of his flocks, and the probability of their future improvement. Satisfied on these points, he was recommended to the attention of lord Camden, then the colonial secretary, and obtained an order for a grant of ten thousand acres of land in the colony, to which he returned with some sheep of the finest quality, selected from the flocks of George III. The grant was chosen in the country of the famous Cow Pastures; the estate received the name of Camden in honour of the grantee; and will ever be memorable in Australian history as the spot where the first fine-woolled sheep were bred, and the first vineyard planted. The estate, in a picturesque region, is now occupied by the sons of the original proprietor. A neat

residence, substantial farm-buildings, thriving gardens, orchards, and vineyards, mark the progress of improvement. "Camden," says a visitor, "lay on my way from Sydney, as if to relieve the wearisome monotony of the land. I found there all that we love to find out of cities,—society, books, a nice house, a garden, plenty of fruit, and kind, agreeable, well-informed hosts."

The first importation of Australian wool into England took place in the year 1807, and amounted to 245 lbs., the produce of Mr. M'Arthur. The enormous and annually increasing quantity appears from the following table.

At present the largest proportion is yielded by the province of Victoria.

In 1828.....	1,574,186 lbs.	.....	In 1840.....	9,721,243 lbs.
1829.....	1,838,642	.....	1841.....	12,399,362
1830.....	1,967,309	.....	1842.....	12,979,856
1831.....	2,493,337	.....	1843.....	17,433,780
1832.....	2,377,057	.....	1844.....	17,602,247
1833.....	3,516,869	.....	1845.....	24,177,317
1834.....	3,558,091	.....	1846.....	21,789,346
1835.....	4,210,301	.....	1847.....	26,056,815
1836.....	4,996,645	.....	1848.....	30,034,567
1837.....	7,060,525	.....	1849.....	35,879,171
1838.....	7,837,423	.....	1850.....	39,000,000
1839.....	10,128,774			

Mr. M'Arthur appropriately named the ship in which he imported some of his best sheep, the *Argo*, because of its connexion with this vast produce, the source of so much wealth. It is an important circumstance, that the Australian climate is believed to be perfectly adapted to the constitution of the animal, even to the very neighbourhood of the tropic. In

latitude 25° south, the fleece has shown no tendency to degenerate into hair, as in the East and West Indies. Though it becomes somewhat lighter, the quality improves, and its higher value on that account in the market compensates for less weight. In Victoria, latitude 37°, the fleeces average 3 lbs. each; in latitude 25°, the average is 2½ lbs.

I. SHEEP RUNS AND SQUATTERS.

The vast tracts of land which have not been alienated from the crown by gift or purchase are the great pastoral regions of Australia. They are technically called "waste lands," and constitute the oft-named "bush" of the settler, indicating the country in a state of nature, as distinguished from the portions enclosed and cultivated in the neighbourhood of the towns. These districts are held on lease for terms of one, eight, or fourteen years, according to the situation. The depasturing license requires the holders, or their representatives, to become fixed inhabitants, with stationary homes. For a tract capable of sustaining four thousand sheep, or an equivalent number of cattle, a rent of 10*l.* per annum is paid; an additional 2*l.* 10*s.* is charged for every thousand sheep above that number; and there is an annual poll-tax levied of one penny on every sheep, threepence each on cattle, and sixpence each on horses, not reckoning lambs, calves, and foals under six months. During the continuance of the lease, no part of the land can be sold

except to the lessee, who may purchase the whole or portions of it at the price of twenty shillings an acre. Upon its expiration, he has a claim for unexhausted improvements, and the right of pre-emption in preference to any other individual. At the present minimum price of crown land, there is no danger of a third party interfering; and hence flock-masters venture to erect buildings, and invest capital, as leaseholders in perpetuity. There are now no lands to be obtained on these terms in the Australian colonies. All have been disposed of, except those which are ineligible in themselves, or at such a distance from a seaport that it would not pay to bring down the wool. But in the anxiety to obtain the largest possible extent of pastoral country, such enormous tracts have been obtained by individuals, beyond all proportion to their own stock, as to admit of portions, or the right of pasturage, being let to new-comers, while the whole may be secured by a rent proportioned to the number of sheep or cattle turned upon it. This practice is not strictly legal, but a usage which being convenient is tolerated. There are other arrangements, which it is needless to recapitulate. The particular tract obtained in the way described is, in colonial phrase, "a run." It may be lightly timbered open forest land, a district of plains bounded only by the horizon, of thickly wooded hilly ranges, or more generally there is a combination of all these features. The extent varies, having been regulated by the means of

the holder, the amount of stock to be depastured, the facility of water-supply, and the character of the ground. But commonly, if the homestead is towards the centre, the run has a radius of several miles in every direction, and sometimes resembles in size one of our smaller counties, rather than the holding of a grazier. As the herbage only thinly covers the soil, growing in tufts, with bare spaces between them, a wide range of country is required to sustain the enormous flocks which are frequently owned by an individual. The native grasses, though spare, are highly nutritious, which compensates for their inferior succulence as compared with the English. An evidence of this nutritive quality appears in the extraordinary journeys which horses will perform, without any other food than the mouthfuls of grass they contrive to snatch by the way. Sixty miles a day are thought a very moderate distance on a fresh horse; and there are many instances of a horse having travelled ninety miles in the same space of time without rest, except for a few minutes where water may be found. An important fact has been noticed with reference to the grasses, that the effect of grazing them, and eating close down, has been to expand the vegetation laterally, the roots coming close together, and rendering the verdure more compact.

The expedient of burning off the long rank grass, in a withered state, has been often adopted, in order to improve the feed. The season chosen is towards the close of summer,

when the vegetation will readily ignite; and on a windy day the conflagration is swiftly carried over vast tracts of country. It obviously requires to be conducted with caution. Bush-fires accidentally kindled by the natives, or by the stockman throwing the contents of his pipe upon the ground, have sometimes endangered the life and property of the settler. The spectacle is often singularly curious in the interior wilds, and rises to the sublime. There are huge volumes of flames rushing along with headlong speed—kangaroos bounding out of their path—snakes and lizards issuing out of their hiding-places to escape—birds flying with screams from the destruction—opossums, bandicoots, and emus, hurrying away from it—and the smoke of the country going up like the smoke of a furnace! For years afterwards the trees of the forest have exhibited memorials of the event in their charred and blackened trunks. The traveller has often met with them deforming the landscape—strange objects—clothed with the livery of death below, and exhibiting the evidences of life in the foliage above. But firing the grass has been condemned by high authority, as likely to cripple the feed permanently in so dry a climate, by the roots being destroyed through long exposure to a scorching sun. On the other hand, it has been practised with great advantage. The truth appears to be, that the experiment will succeed if rain soon falls, but may be highly detrimental if a season of drought follows.

The holder of a run beyond the settled and proclaimed districts—the real boundaries of the colonies, where the great pastoral grounds occur—is the “squatter” of ordinary and official speech. This term is most properly applied to one who goes out into the unoccupied wilds, and, finding land suitable to his purpose, attaches himself to it on his own authority. In this way the pastoral regions of Australia were at first appropriated, the system of holding them on lease from the crown being an after arrangement, which the necessity of the case originated. The barbarous appellation has been adopted from the Americans, but it denotes a very different class from those so denominated in the western world. The squattocracy of the south includes no mean number of retired officers of the army and navy, of others withdrawn from the legal or medical professions, graduates of Oxford and Cambridge, younger sons of good family, and even noble connexions in England, who have preferred seeking independence by active employment abroad, to a life of indolent lounging at home. Rude was their fare at first, and rough their accommodations, while occasionally severe privations were not wanting. There was a journey to be performed to the location, often of three or four hundred miles, the greater part through a wild country, intersected with heights, gullies, and streams; and to be traversed with flocks, herds, retainers, and bullock-drays carrying stores—the whole resembling the migration of one of the old-

world patriarchs, or of an Arab sheikh. On reaching the scene of future operations, months might pass away before the semblance of a dwelling appeared, the care of the live-stock being the first consideration. "Bow-yards," made of the branches of trees, in a circular form, hastily put up, enclosed the sheep at night. "Gunyas," or long pieces of bark placed together in a pyramidal form, sheltered the shepherds. The master reposed under canvass. But not unfrequently a violent thunder-storm banished slumber. The wind brought down the tent upon the occupant, and upset the frail bark cabins, while the rain poured in tremendous showers, extinguishing the log fires, and drenching the entire encampment.

A stranger visiting one of these primeval homes in the wilderness would never distinguish the flock-master from his men. He might be found cooking his mutton in a frying-pan, baking damper, boiling water in tin pots for tea, driving a bullock-dray, counting over his stock, or galloping after runaway cattle. His dress was of the most primitive description; his first permanent dwelling a heap of rudely piled logs covered with bark. A blue or red serge shirt, corduroy trousers with manifest signs of wear, a black leather belt round the waist, a dusty straw hat, and a dingy beard, not of yesterday's growth, was the ordinary costume. These days of rude experience, of roughing it in the bush, are bygone times to a great extent in the land of the squatter. Not

only the comforts, but the luxuries of life have found their way into the wilds of the interior; with the humanising influence of domestic ties, and establishments exist upon which thousands of pounds have been expended. There are neat residences, commonly wooden, roofed with shingles of hard timber, cut in the form of slates, and put on in a similar manner. Taste-ful shrubberies, flower and kitchen gardens, the latter stocked with the best varieties of fruits and vegetables, surround the homesteads. Adjoining are enclosed paddocks for horses, with others for the agricultural produce required by the household. At a further distance, on the slope or brow of a hill, a huge shapeless building may be seen, somewhat unsightly to a lover of the picturesque, but the boast of the owner—the shed in which his flocks are shorn, and the wool stored. The interior of the dwell-ings, if not fitted up in fashionable style, corre-sponds in comfort to those to which the thriving yeomen of England are accustomed. The best Staffordshire ware has taken the place of tin pots; damper has given way to good wholesome bread; well-dressed joints have banished rudely cut slices of grilled mutton; and poultry, with now and then kangaroo-tail soup, a haunch of emu, or cygnet-pie, appear at table. Tolerably well filled book-shelves are not entirely absent, though few and far between.

II. OUT-STATIONS.

On a first-rate run, at the distance perhaps

of eight, ten, or fifteen miles from the homestead, there are out-stations, where the sheep are kept and depastured in flocks of varying extent, from five hundred to fifteen hundred each. These outlying establishments are planted sufficiently apart from each other, so as not to interfere in their economy. Two flocks are usually attached to each station, with two shepherds to tend them, who have bark huts for their dwelling; and there is a watchman to keep guard at night, who also officiates as hut-keeper by day. This arrangement prevails where single men are employed. If one of the shepherds, or both, is married, the wives are the hut-keepers, and by the husbands performing the night-work between them, they divide the wages of the watchman. Where there are children, they relieve the peculiar solitude and monotony of Australian pastoral life, and grow up to be usefully employed. But in a few years the parents may save sufficient money to enable them to embark in occupations on their own account, and it is entirely their own fault if this is not accomplished.

The flocks are led out to pasture in opposite directions. With the early dawn, the shepherd rises, and makes a substantial meal of tea, mutton, and damper, far better than the best dinner which an agricultural labourer at home can command. The compost called "damper," so often mentioned in accounts of life in the interior, has elicited various opinions, some preferring it to bread, while others think it the worst

way of spoiling flour. There are those who consider the true etymology to be Dampier, the name of a celebrated navigator, who is supposed to have first invented it; while not a few refer the name for a derivation to its property of damping the appetite, being close, hard, and heavy, and requiring almost the stomach of an ostrich to digest. A stiff dough is made of flour, water, and salt, kneaded till the arms ache, and the mass has acquired the consistency of stiff clay. It is then made into a cake, two or three inches thick, and from twelve to eighteen broad. The wood ashes are partially raked from the hot hearth, and the cake being laid on it, is heaped over with the remaining hot ashes, and thus baked. When done, and wiped with a cloth, the outside looks dirty, if it is not so. In the bush, where brewers' yeast cannot be procured, this indurated dough is the usual bread. With a wallet of meat and damper for the day, the shepherd commences his task at sunrise, or soon after, letting out the sheep from the fold while the dew is on the grass. He has simply to keep them within sight, let them feed at leisure, and spread well over the ground. When about to go into thick scrub, he heads them back by walking round, or sends his dog, while old sheep will face about like soldiers on hearing his shrill whistle. If possessed of a gun, he may bring down quails, pigeons, and other birds to recruit his own larder. Though he holds no crook, and plays no tuneful pipe, like the shepherds of Arcadia, yet he has often

a Jews' harp or an accordion to enliven the calm solitudes of nature. Great numbers of both instruments are sent out to Australia, and are eagerly sought after by the secluded dwellers in the interior.

About noon, the greatest distance from the station will have been accomplished, perhaps three or four miles, when the sheep are brought to camp for an hour, or lie still in some shaded place, chewing the cud, with water near. The shepherd meanwhile discusses the contents of his wallet. In a similar manner, he brings back his charge to the station, travelling slowly, and reaching home about sunset. The flock is then folded for the night within hurdles, which are shifted to a different spot every other day. The daylight of another morning brings with it the routine of the preceding one. Wet or fair, hot or cold, summer or winter, the chapter of daily life is the same. The watchman's duty is equally simple. He has a watch-box near the fold, with arms and dogs; and often goes to sleep, trusting to the latter to awaken him in case of any cause of alarm occurring. But in stormy nights, he must occasionally walk round with a mallet to see that the hurdles are firm, and render them so, if in danger of being blown down. The great enemy is the dingo. It rarely attempts to overleap the hurdles, but will soon gnaw a hole through them, if not driven off, and inflicts great damage upon the flock. This mischievous animal has been nearly exterminated in Victoria by the aid of strychnine.

Each shepherd is generally allowed to have his dog; the watchman two, and no more. But some masters prohibit them altogether, as the men are apt to leave the flocks almost entirely to the management of the animals, and the sheep get into low condition.

It will thus be seen that almost any one is competent to discharge the duties required at an out-station. Docility and faithfulness, without any previous training, and a few weeks' experience, are alone necessary to form the valuable shepherd. Nothing need be known of the veterinary art, for the diseases which may affect an entire flock demand the special care of the owner or overseer, while sheep are not of sufficient value to have individual cases of sickness treated with much concern. The man who has been brought up a shepherd in England or Scotland, may have acquired habits or prejudices exceedingly difficult to shake off, though quite unsuitable to his new position in Australia. Hence those who have nothing to abandon, and everything to learn in the way of employment, are in the best circumstances to adopt a fresh vocation. This consideration led the old flock-masters, in the days of convict service, to prefer having assigned to them as servants, the pickpockets of London and thieves of Manchester, to transported poachers and rogues from the agricultural districts. The oddest groupings of previous professions have been found in charge of flocks. A writer notices, as having come under his own observation, an apothecary,

a lawyer's clerk, three sailors, a tailor, a counting-house clerk, a Portuguese sailor, a Cingalese, a broken-down merchant, an ex-lieutenant in the East India Company's service, a Gipsy, a black fiddler, a dancing master, a Jew, a gentleman's son, and a barman. The three last managed the best. According to the latest accounts, the wages of a hut-keeper, the lowest occupation in the Australian bush, are £32 per annum, with rations into the bargain. The latter are weekly supplies of meat, flour, tea, and sugar, in quantity more than one man can consume. Three-fourths of the money wages may be laid aside; and thus, in two or three years, a sufficiency may be acquired to become the owner of a few sheep. These may be turned upon the run, a consideration being paid to the master, and service be continued till larger means are gained, so as to quit it finally. It is true that the life is solitary, and the occupation monotonous; but it is free from onerous toil, exempt from cankering care, passed in healthy circumstances, and cheered with the prospect of independence. How many have the sweat daily upon their brow in England, toiling in pestiferous scenes, and following monotonous handicraft, without the slightest hope of ever rising above their existing condition!

III. BUSY AND ANXIOUS TIMES.

Such times mark the life of the sheep-owner and his retainers. The lambing season, which

falls generally in September, the first spring month, is one of the busiest periods. Premiums to induce them to exert themselves are commonly given to shepherds, proportioned to the number of lambs that are reared for every hundred ewes in the flock ; from eighty to ninety per cent. is reckoned good, and a greater percentage is not uncommon. The Australian sheep are said to double their number in four years, and in many instances in less than half that period. There are dangers to be guarded against at this period, peculiar to the country. Eagles and eagle-hawks can carry off a lamb a day old in their talons ; crows may pick out their eyes ; while the native dog, where he exists, is ever on the alert.

Sheep-washing commences usually about the middle of October, and is performed in various ways. Preference is given by some to a running stream ; others choose a still lagoon or standing pool. The experiment has been tried of using warm water, and water softened by solutions of soda, or other ingredients. The common mode is to construct soaking-pans in flowing water, into which the sheep are thrown, and left to swim about for a few minutes. They are then taken in hand, one by one, by a row of men standing in the water, who all rub them in succession, till the master or overseer gives the signal to "pass on." The animal is then delivered over to the shepherd, and placed upon clean ground. Great care is taken in this operation, as, by its completeness or other-

wise, the price of the wool may be affected several pence per pound.

Sheep-shearing commences almost immediately afterwards, and occupies the month of November. For three or four days the sheep are left to dry, and also to allow the "yolk," or grease from the body of the animal, to rise, adding to the weight and softness of the wool. Shearers travel from station to station, during the season. They are paid by the score, quick hands always earning excellent wages. Emigrants, entire strangers to the art, have speedily acquired it. Some of the best hands have been London tailors. The work is performed at the homestead, in temporary bark sheds, to protect from the sun and rain, or in permanent wooden buildings, which serve as storehouses. But great difficulty has been recently experienced by flockmasters in getting their sheep clipped, owing to the scarcity of labour. Men, at the gold diggings, on one occasion, demanded all the wool as their pay. As the fleeces are shorn, they are gathered up, folded, sorted, and placed in a woolpack, capable of containing about a hundred of them, weighing some two hundred and fifty pounds. When pressed and sown up, the pack is called a bale, upon which the private mark of the proprietor is placed. Drays drawn by teams of bullocks, each laden with from fifteen to twenty bales, convey them to the nearest port, Sydney, Melbourne, Geelong, or Adelaide, as the case may be, where they are sold to the merchants, and shipped for

England, though some of the more extensive wool-growers send the produce direct to their own agents in London. The return of the drays to the station is the great event of the year to the household; for they bring back from the town the domestic stores needed for consumption during the next twelve months, with clothing and luxuries, seldom failing to introduce articles not previously possessed by the dwellers in the wilderness.

Virulently infectious diseases, catarrh and scab, occasionally break out in flocks, and commit fearful ravages. Such visitations are peculiarly anxious times to the proprietor, for many have suffered a total loss of property. Catarrh, sometimes called influenza, is rapidly fatal in its progress, if it appears in a wet cold season. Entire flocks have perished of the complaint in the course of a single night, the owners reckoning up their losses by ten, fifteen, and twenty thousand sheep. When not very malignant, and the season is favourable, the disease may be averted and cured by perpetually shifting the flocks to new ground, both by day and night. The scab, a cutaneous disorder, is sometimes generated by filthy folds, a preventible cause. It is so contagious as not only to be transmitted by actual contact, but clean sheep are sure to become foul by simply passing over infected ground. Shepherds have been known intentionally to expose them to such circumstances under the influence of revengeful feelings; and carelessness is a common cause of

injury. As the infected animals seldom fall off in condition, they are commonly fattened in order to be boiled down for their tallow. A Scab Bill, for the prevention and extirpation of the disease, originated as much discussion in the first legislative councils of New South Wales, as the Health of Towns Bill in the British parliament.

IV. CATTLE STATIONS.

While flocks are depastured on one part of a run, herds of cattle may occupy another, or the establishment may be entirely a cattle farm. The economy is much the same as at a sheep farm, but the duties are altogether different, and life has a far more active, bolder, and rougher cast. Herds are kept at out-stations, each numbering from five hundred to two thousand, or even three thousand head. They are under the charge of stockmen, or cattle herdsmen, two or three being attached to a large drove. The stockman has his hut, hut-keeper, whip, and horses. He may be known by an energetic gait, a free, daring, and somewhat reckless manner, a beard of ancient date, a tweed jacket, fustian or leather trousers, and a cabbage-palm hat securely fastened beneath the chin. His whip, the symbol of his office, has a short thick handle, like a hunting-whip, with a tapering thong of twelve or fourteen feet, terminating with a "cracker." This formidable implement, only manageable by a strong arm, is handled with terrible effect. Its report, as

sharp and loud as that of a pistol, is heard far and wide, and recognised by every bullock in the herd, many a hide having smarted beneath the lash. The stockman has to follow the drove throughout the day, at such a distance as not to alarm it, keeping it on good pasturage, and preventing any unruly individual from going astray. Every now and then some wild youngster, throwing up head and tail, will make a bolt. Off gallops the guardian rider after him, over gullies, chasms, and fallen trees, to drive him back. On getting in front, down goes the head of the straggler, and with a vicious bellow he charges the bold herdsman who has dared to intercept his path. At a touch of the rein, the well-trained steed swerves aside, while the heavy-thonged whip descends with a telling sound upon the beast. Headed a second time, he turns round, and a lash on the flank sends him forward as nimbly as he had rushed away.

Towards sunset, the herd is driven to the stockyard at the station, unless sufficiently broke in to remain out at night. This is an enclosure of strong posts, sufficiently capacious to contain the whole drove, with proper divisions for drafting off any portion, should it be required, for market and other purposes. Cattle, in the Australian bush, are apt to become excessively shy, so as rarely to allow a man on foot to get near them, though freely approached on horseback, and the habits of their wild progenitors are largely acquired. Thus they

go in single file to water, headed by the bulls : and when alarmed, they take advantage of the inequalities of the ground, stealing off into hollows, where they are out of sight, the bulls bringing up the rear. They have also their camping-places, spots usually shaded with trees, and near water, to which they retire during the heat of the day to rest, and chew the cud. Every herd has several of these camps, to which a certain number adhere, so that the stockman knows where to look for particular individuals. Frequent yarding, and milking the cows as often as possible, are the modes adopted to promote subjection and domesticity. When once accustomed to a range of country, the herds seldom or never stray from it, during the time the pasturage affords them sufficient food. So strong, indeed, is this attachment to place, that, when removed to another run, they have been known to travel back fifty, a hundred, and even two hundred miles, to their old haunts.

No Scythian, or Tatar, ever lived more on horseback than the stockman. His equestrian feats are remarkable, and would astonish the boldest jockies and steeple-chasers at home. A perfect understanding seems to subsist between the rider and his horse. The latter, however wild and shy to a stranger, unmercifully throwing out his heels on being approached, will come at full speed to the side of his master at a whistle or a word. The whole art of riding in Australia has been said to consist in a well-established and faithfully-kept

compact between the two parties in the affair ; that the horse shall look out for all dangers underfoot, including chasms in the earth ten feet wide, and 'of unknown depth—the rider guarding his own brains from overhanging branches of forest trees, which emphatically threaten them a dozen times in the course of a few minutes, while scampering after refractory stock. There is, moreover, a sort of tacit agreement, that the stockman shall have a keen eye to the movements of the enemy—some wild and infuriated bull, perhaps—though the horse is not over particular in this respect, as his own sagacity leads him to anticipate and avoid the animal's charge. He will securely traverse the most difficult ground, come to a dead stop in an instant at full gallop, double like a hare, swerve aside, sharply turn round, and pirouette upon his hind or fore legs, as occasion may require. However apparently perilous the work, it is very rarely that accidents of serious consequence occur. Fond of his Mazeppa-like steed and his vocation, the stockman often looks down with supreme disdain upon the "crawling shepherd."

Mustering stock for branding, inspection, or drafting off fat bullocks to market, is the great event of a cattle-farm. It takes place once or twice a year. All hands from stations and runs around for many miles are called upon for their assistance, which is always cheerfully rendered, as each master in turn requires the same accommodation. They commonly assemble

over-night in order to be ready for the next day's work at the earliest hour. "On the appointed morning," says an actor in one of these affrays, "we mustered twenty-seven hands, all good men and true ; and mounting, we dashed off, describing a large circle in order to bring all our herds in at once. After several hours, the various lots were seen tending towards the common centre, the stockyard. We had two yards, at some distance apart, and, dividing the herd, a portion was headed towards each. Now commenced the tug of war ; no force, no persuasion, could induce many of them to enter the gates ; they seemed to anticipate what was to follow ; the refractory would at one moment dash off at full speed, hoping to escape, charging everything that came in their way. Frustrated in that, one would dodge into the other herd of cattle, and commence his pranks afresh there ; while not a few of them, after several trials, lay down on the ground, and nothing but severe lashing would make the cunning brutes rise. At last they were all enclosed. Near the gates sat two of the older stockmen, with the description-books, entering the written portraits of all the youngsters we had to mark. The branding irons are of various sorts. Some owners are content with initials ; others have a fancy for crosses, stars, etc. ; and some make use of most unintelligible hieroglyphics, for no better reason than that the brand should not be imitated. Little good if it were, for such marks are always obscure, and the master or brander himself

could seldom swear to his stock. The branding irons are attached to a long handle, to avoid injury to the operator's hands, and, when heated to redness, are applied to the flank, or sometimes the shoulder ; the latter is, however, in my opinion, a dangerous plan. The cattle are lassoed and thrown down if full grown, or manifesting anything like a tartar spirit ; but the calves are merely branded close to the stockading, and then marked whilst standing. This lasted us for some hours, amidst shouts of laughter ; one moment an unruly beast resisting all efforts to catch the head in the noosed rope ; or, when caught and branded, making every one near fly from his frantic rage, the scampering men rolling over the rails in their haste to escape. What with blunders and narrow escapes from accident, peals of laughter, the hoarse bellowing of the caged cattle, and the shouts of those standing around, volunteering advice and help, which served to render the 'confusion worse confounded,' such a scene can be but faintly described ; to be appreciated, it should be seen." Branding is required by law in order to identify stray cattle. The operation is a painful one, and seems to be performed with careless cruelty.

V. BOILING-DOWN.

In the year 1843, when live stock had sunk to an unprecedentedly low value, an old colonist had recourse to the expedient of boiling down the entire carcasses of some of his sheep, for the

extraction of the tallow, and thus turning them to account. This plan has long been adopted in various overstocked countries for the sake of the hides and tallow, which are always saleable articles, and realize a good price in the English market. The system proving profitable in Australia, it has been regularly established, and enormous numbers of sheep and cattle have annually terminated their career in boiling-vats. The process is abundantly disgusting and revolting in its details, and the places where it is conducted, in the vicinity of the towns, are no ornament to them. The living victims are driven to these spots, and huddled together in enclosures. A ferocious-looking man enters, armed with an axe, and commences knocking down the sheep right and left. Others follow with knives to complete the work of death. An entire flock prostrated in agony in a few minutes, the life-blood deluging the fold and bespattering the men, the moans and convulsive struggles of the dying animals, form a truly horrible scene. But as custom reconciles us to strange things, this butchery is simply regarded as an affair of business, to be despatched in the easiest and quickest way, and is conducted with as much indifference as cutting down so much stubble. The carcasses are then rapidly skinned; the hind-quarters are cut off to be sold as butchers' meat, on account of their having but a small proportion of fat; or they are cured, and converted into mutton hams. The residue is

thrown into the coppers, and after the tallow has been extracted, the flesh goes to the pigs.

Cattle are treated in a similar manner. Certain portions of the animals, tongues and rounds, are converted into salted or preserved meat for export ; and it has been proposed to collect the gelatine, or essence of the boiled flesh, to be sent in cakes to the London market for soup. Neats'-foot oil is obtained from the feet. The bones and hides are also valuable ; the latter especially so in Australia. Green ox hide is there put to an endless variety of purposes ; and used as a kind of universal social specific. It is the great bond that keeps the edifice of domestic life from sad derangement in various districts. Almost everything is tied, held, or mended with it. Bales of wool in the drays, and hurdles at the folds, are fastened with strips of green hide. Bullocks and horses are roped ; saddles and bridles are repaired ; and stockwhips are made of green hide. It forms the hinge on which thousands of doors are hung, and the hasp by which they are fastened. To myriads of pots, panchions, and buckets, it serves the purpose of a handle. If it is now only an article of utility to man, there was a time when it was employed as a scourge, many a convict having writhed under a flogging with green hide.

The amount of work performed at the boiling-down establishments, of which there are more than a hundred, may be inferred from some items of information relative to one on

the Bremer River, in the district of Moreton Bay.

Average number of cattle boiled down, fifty per day, for six months during the year.

Quantity of tallow obtained from each carcass, one hundred and eighty to two hundred and sixty-six pounds, which sells at threepence-halfpenny to fourpence per pound, or £39 per ton.

When boiling down sheep, the number disposed of is from six hundred to seven hundred per day.

Quantity of tallow obtained from each carcass, from fourteen to twenty-four pounds, at fourpence per pound.

From the feet of each of the horned cattle slaughtered and boiled down, there is obtained one pint of neats' foot at four shillings to five shillings per gallon.

The hides are all salted, and are worth from five shillings to seven shillings each.

There are three boilers, each capable of containing eight bullocks at once. The process is effected by steam, and lasts eight hours.

During seven years, from the commencement of the system to December 31, 1850, in New South Wales and Victoria, there were thus disposed of, 2,364,539 sheep and 261,169 horned cattle, which produced 673,943 cwts. of tallow, representing a money value of £1,314,183. In a single year it has been calculated, that not less than sixty-two million pounds of meat have been literally thrown

away. It seems extraordinary, and is certainly lamentable, that there should be this enormous waste of valuable animal food in one of our dependencies, with many at home on the verge of starvation, and thousands to whom it would be of the highest benefit.

Had we to contemplate Australia as destined to be exclusively connected with flockmasters and graziers, it would not be with feelings of unmingled satisfaction. Its future would be a somewhat cheerless vision. Eminently pastoral nations have never been great in the annals of civilization, and seem precluded by circumstances from becoming so. The tribes are semi-barbarous, where the management of flocks and herds is the predominating pursuit. Wool-growing and cattle-breeding employ less of combined industry and art, diffuse less of occupation among the people in proportion to the space they require, and are thus of less civilizing and beneficial influence than almost any other department of human labour. The tendency of pastoral life is to disperse population, and not concentrate—to cut up a community into pitiful fragments, instead of binding it together in intimate association. Men become so many units, thinly scattered over vast tracts of country, living isolated, and apart from the humanizing influence of social institutions, which are only found where numbers exist in neighbourhood. It is true that association has its dangers, but it is the condition most suitable for human nature, essential to the growth of

intelligence, the march of civilization, the advance of religion, and the formation of powerful states. The gregariousness of man—one of the instincts of his being—is in harmony with the written records of the will of Providence; for the possession of “cities to dwell in,” implying the aggregation of numbers, was one part of the Divine plan, when the Almighty contemplated the consecration of a people to himself. Nations thrive where the pastoral is an adjunct to agricultural, mineral, manufacturing, and commercial occupations; where flocks and herds are seen in connexion with arable lands, vintages, plantations, mines, factories, fisheries, and shipping. Hence, with pleasure, hope, and confidence, the future in relation to Australia may be contemplated, as a country not only capable of producing wool, but of growing the vine, the fig-tree, and the olive, yielding also cotton and silk, possessing likewise in abundance the useful with the precious metals—natural attributes adapted to sustain, combine, and improve the numerous population at present flocking to its shores. Let them but reverence the word, and respect the will, of Him who is equally the Lord of southern as of northern lands, and they may expect to prosper, though not enriched by the GOLD FIELDS, to which we now proceed.

CHAPTER V.

THE GOLD FIELDS OF AUSTRALIA.

THE DISCOVERY, THE EXCITEMENT, AND THE CROWD.

Searches for gold—Lateness of the Australian discovery—Native condition of gold—Natural operations—Vein gold—Stream gold—Anticipations of science—Sir R. Murchison—Mr. Clarke—Mr. Hargraves—Correspondence—Announcement of gold in Australia—Bathurst—Commencement of gold-digging—Excitement at Sydney—Rush to the diggings—Disappointment of numbers—Gold regulations—Events in Victoria—Excitement at Melbourne—Vast immigration—Increased value of property—Scarcity of houses—Anomalous condition of society—Prodigality and demoralization of gold-diggers—Crime connected with the pursuit.

GOLD in its native state was not known to exist within the wide-spread boundaries of the British empire, in sufficient quantity to be of commercial value, till the recent marvellous revelation of it on the western slopes of the Australian cordillera. It is not improbable, that in ancient times some proportion was obtained from soils and gravels in particular districts of our own island, of which the Druids made their ornaments; for the precious metal is very widely disseminated, though in a sparing manner. Its quest at home, as well as its pursuit abroad, in the early stages of maritime discovery, often engaged the attention of our ancestors, who

largely exemplified the credulity which is deaf to the cautions of judgment, and blind to the certainty of loss. A stone, brought from the polar regions by Frobisher, during the reign of queen Elizabeth, excited the wakeful avarice of the metropolis, on being pronounced by the refiners to contain gold. Imagination converted the moss-grown barrens of the Esquimaux into realms of infinite opulence, and an expedition was immediately fitted out under the commander to procure more of the fancied treasure. It sailed to the northern ocean, and found large heaps of earth upon the shore, which seemed plainly to contain the coveted wealth. Spiders abounded, and "spiders" were affirmed to be "true signs of great store of gold." The admiral toiled with his crews like a day-labourer to freight the ships with the useless mass. But as the parties to foolish speculations promptly consign them to oblivion, in order not to have their judgment impeached by the truth being known, we are unable to state in what way the worthless debris was disposed of. At Leadhills, in Lanarkshire, the alluvial soil contains gold in small grains, sometimes associated with quartz. In the reign of James v., three hundred men are said to have been employed for several summers in searching for it, collecting it to the value of 100,000*l.* sterling. It is well known to have been used at the Scottish mint, though the amount is probably exaggerated; for the gold gathering ceased to be profitable, and was abandoned when the wages of the men rose to

fourpence each per day. One of the places where the soil was washed long bore the name of "Gold-scour." At that time fragments of one or two ounces were sometimes found, but the two largest pieces obtained for some years have only weighed sixty and ninety grains. The product occurs in the stream deposits of the county of Wicklow, in Ireland. It was eagerly sought after towards the close of the last century, at first by the peasantry and then by the government authorities, but the yield speedily ceased to pay the expenses of labour. A remote dependency of the realm has now rendered the empire of Great Britain conspicuous in the list of gold-producing countries.

For half a century after the occupation of Australia by the white race, the existence of gold was not in the slightest degree suspected, though the soil is so richly impregnated with the glittering product as to vindicate from exaggeration the lines of an antipodal poet,

"Behind our wild blue mountains,
Were kingdoms to be sold,
There's wealth enough to pay the price,
In pure Australian gold."

Shepherds and stockmen trod the surface daily at the very sites where the yield has been most prolific, and travellers explored the country without observing an indication of the precious stores. Nor in the lapse of ages had the keen-eyed aborigines made any acquaintance with them. They were never met with wearing any golden ornament, though not indifferent

to mineral products, placing a superstitious value upon shining stones, and crystals of quartz. This ignorance of the native tribes has excited surprise, and it betrayed many to an erroneous conclusion. The Dutch, in some of their early visits to the coast, had the discovery of gold in view, but inferred its non-existence from never observing any fragment in the possession of the natives. Leichhardt, the intelligent traveller, committed the same mistake. "From the absence of brilliant ores, or precious stones," he states, "in the bags or dillies of the natives, I concluded that neither precious stones nor brilliant metallic substances existed in the country where they lived. Those with whom we came in contact generally admired our gold and silver chains and watches very much, but had nothing to show in return except broken shells from the sea-coast." Geological considerations brought him to a different conclusion; for, when residing at the German mission station at Moreton Bay, in the year 1844, previous to his departure for Port Essington, he recommended the missionaries to search for gold towards the sources of the "Brook Kidron," on which their station stood, deeming it highly probable that they would find the precious metal in that locality.

The conditions under which native gold occurs sufficiently account for the late date of the Australian discovery. It is very rarely found in its parent bed, but by far the largest quantity is met with as transported material, in

extremely minute particles. In its original site, gold is generally imbedded in veins of quartz, by which slaty and other metamorphic rocks are traversed, and it seems to occupy a comparatively superficial position in the matrix or veinstone. The earth has itself turned miner to dislodge the product from its native seat, and bring it within the reach of man, without being open to his eye. Readily acted upon by the atmosphere, the schistose rocks have been disintegrated, exposing the quartzose veins, and leaving them unsupported. Gravitating downwards, the blocks have broken up, and crumbled in their onward course, letting loose the tenacious gold, in large or small portions. Torrents running vehemently down the sides of the mountains have borne the detached material to lower levels and distant scenes, continually grinding it down, till hollows have arrested the drift, or it has sunk into the cleavage fissures of the slaty masses forming the "pockets" of the vocabulary at the diggings, or it has been quietly deposited in the sand or mud as the streams have subsided. This process, going on for ages, satisfactorily explains all the phenomena of gold-finding in Australia, and other auriferous districts. The largest produce has, in every instance, been found in the lower levels—in ravines, gullies, and creeks—water-courses, more or less permanent—visited by occasional mountain-floods. With few exceptions, the gold has an abraded, battered, and water-worn character, detached from every

particle of the more fragile quartz which originally invested it. Buried to a varying depth in alluvial deposits, it is not open to popular observation, the surface of rich tracts presenting no more appearance of it than that of Bagshot Heath or Salisbury Plain. Disseminated in extremely minute atoms, it reveals itself only in the process of washing the soil. Hence shepherds and stockmen were familiar with the valleys for years, unconscious of their value ; and used the gold-bearing streams for domestic purposes, ignorant of the riches in their beds. Hence, too, in Australia, as elsewhere, attempts to trace the drift to its original site, and extract the precious metal from the parent rock, will probably be crowned with failure, should they be made. Natural agencies, at work through a long series of generations, have already reaped the harvest on the mountains, and scattered the produce down their slopes, and at their feet. It has been aptly remarked, that to expect to find gold in greater abundance in the bowels of the rocks, merely because they have poured a rich supply into the valleys, is something like expecting the kernel in the nut after it has been carefully extracted.

Gold is, indeed, obtained in a few places from its parent bed by strictly mining processes. But the hardest rocks have to be quarried and removed, to be crushed by powerful machinery, and subjected to various laborious processes, which render the expense of extracting it so enormous, while the yield is so

scanty, that undertakings of this kind are rarely successful. Seen in its native place, the metal often occurs *foliated*, or in leafy expansions of extreme thinness ; sometimes *dendritic*, or in branchy forms, probably made up of minute crystals ; but more generally, it is disseminated in very fine grains through the original rock. How it has been produced is a point upon which geologists have speculated. But as a simple substance, or element, we have no right to assume production at all posterior to the period when " He spake, and it was done ; he commanded, and it stood fast." Vein gold is very rarely pure, and chemistry has to be resorted to for its reduction to a simple condition. It is otherwise, generally, with stream gold. The atmosphere and the torrents have so acted upon the foreign ingredients, as to set free the gold, so that it may be picked up in a pure, or nearly pure state. Natural processes have thus performed for the gold-digger the office of chemist as well as miner, sending him the product comparatively purified.

Stream gold occurs occasionally in the form of fragments or lumps of some size, usually varying from the dimensions of a nut or gooseberry to a pin's head. These are the "pepitas" of the Spaniards, (*pepita*, seed,) and the "nuggets" of Australia, a term imported from California, the derivation of which baffles our knowledge. Far more considerable masses have been met with—splendid prizes to the

finders of them. When much smaller, and still rounder, we have "gold dust;" and when the grains are flattened, they are called "scales," or "spangles." It is convenient to estimate substances by their weight, and in comparison with the weight of an equal volume of water. Now the relative weight, or specific gravity of quartz, and of the other compact rocks in which gold is imbedded, may be roughly stated at $2\frac{1}{2}$, while the specific gravity of the metal is 18 or 19. In other words, the gold is about seven times heavier than the rocks with which it is ordinarily associated. Hence a large fragment of gold, or of quartz containing a considerable proportion of it, cannot be far from its original site, owing to the resistance offered to the transporting power of water. It can only be expected, also, to occur sparingly in drift, while dust and scales may be carried to great distances, be sown profusely and somewhat equably on far away sites. It follows, also, that wherever obstacles occur to slacken the force of a current, as the bends of creeks, and the intersection of their beds with protruding ribs of rocks, there the heavier gold will find a resting-place, filling up holes and crevices in the rocky bottom. It is precisely such sites that are first visited by experienced searchers, and their explorations have been richly rewarded from the sandbanks formed at these spots, and the natural "pockets" in the bed of the streams. Diggings are discriminated into "dry" and "wet," according to their

position. The dry diggings are carried on in the general drift spread over a country by former inundations, composing the borders of the existing water-courses; while the wet diggings are conducted in their channels. The distinction ends here; for, except in the case of nuggets, the soil of the dry diggings has to be conveyed to water, and washed, for the gold to be detected.

Science opened the way to the discovery of the golden store of Australia, while flock-masters and graziers had it unperceived under their very noses. The presumption of its existence was entertained, and confidently expressed, thirteen thousand miles away, by parties who never visited the region. Two physical astronomers, a few years ago, came to the conclusion, that a planet, entirely strange to observation, revolved beyond the known boundary of the system; and Neptune was discovered in the indicated place. In a somewhat similar manner, geologists announced the gold-bearing character of the Australian coast chain, and the prediction has been verified. This opinion was founded on the mineral composition of the mountains, which was first clearly and laboriously illustrated by Strzlecki. Experience has shown, that wherever a certain class of sedimentary rocks—clay-slates, old limestones, and greywacke sandstones—are associated with, and penetrated by another class of igneous products—greenstone, porphyry, granite, sienite, or serpentine—and are

consequently in a metamorphosed or crystalline condition, there auriferous quartz veins occur, containing gold in greater or less quantities. Such is the constitution of the Ural chain, the Sierra Nevada of California, the Blue Mountains of Australia, and the rocks of other auriferous regions. The general laws of nature, or rather the laws of God in nature, are remarkably uniform. Diamonds, however they may vary in purity, occur in the same form, of the same substance, and under the same circumstances, whether found in India, Borneo, Brazil, or in the Russo-Asiatic countries. Copper ores exhibit the same broad features of resemblance as to their character and disposition, whether excavated on the shores of Lake Superior, from the ridges of South Australia, or the barren lands of Cornwall. Coal exemplifies the same structure and arrangement—cropping out from its native bed and dipping in—whether in the county of Stafford, Vancouver's Island, or New South Wales. Gold is uniformly found under the same peculiar conditions, whether in connexion with the Ural, California, or Australia; and the parallel holds good as to the quantity produced, and the quality of the metal. The smallest spangles are everywhere the purest; all the larger pieces being contaminated with a varying percentage of silver, copper, iron, manganese, or other products.

The first reference in a written document to the existence of gold in Australia occurs in

a despatch addressed by sir George Gipps, September 2nd, 1840, to the secretary of the Colonies, but not published till a later date. It enclosed a report from count Strzlecki, mentioning an auriferous sulphuret of iron, partly decomposed, yielding a very small quantity of gold, although not enough to repay extraction, which he found in the vale of Clwydd. In the year 1844, sir Roderick Murchison having personally examined the Ural Mountains, and become familiar, through scientific researches, with the geological structure of the Australian, called attention to the striking similarity of the rocks of the two widely separated districts, inferred the existence of gold in connexion with the latter as with the former, and recommended a search for it, as likely to lead to a successful and profitable result. About the same period, Mr. G. W. Earle, in a paper communicated to the Royal Geographical Society, and published in the Journal for 1845, noticed the promising character of the mountain ranges of Australia, and anticipated the discovery in them of the mineral wealth of Asia. Sir Roderick Murchison did not lose sight of the question he had mooted. In 1846, he addressed the Royal Geological Society of Cornwall, recommending unemployed Cornish tin-miners to emigrate to New South Wales, and dig for gold in the débris and drift of the Australian Cordillera, in which he had recently heard that gold had been discovered in small quantities, and in

which he anticipated, from the similarity with the Ural Mountains, that it would certainly be found in abundance. Besides this, he put himself in communication with parties on the spot, who transmitted to him some actual specimens, and brought the subject under the notice of the home government in November, 1848. But either from want of confidence, or a wish to avoid disturbing the regular industry of the colony, no steps were taken to test the accuracy of his views. In 1849, in an "Essay on the Distribution of Gold Ore," read by the geologist before the British Association, he reminded his hearers, that in considering the composition of the chief or eastern ridge of Australia, and its direction from north to south, he had foretold—as well as colonel Helmerson, of the Russian Imperial Mines—that gold would be found in it. He stated, that in the last year a gentleman resident in Sydney, who had read what he had written and spoken on this point, had actually sent him specimens of gold ore found in the Blue Mountains; while from another source he had learnt that the parallel north and south ridge in the Adelaide region, which had yielded so much copper, had also given undoubted signs of gold ore.

In New South Wales, a similar conclusion was drawn from the same data by at least two residents. Mr. F. Forbes, of Sydney, published a paper, affirming in the strongest manner the existence of gold; but not being listened to,

or not encouraged to prosecute researches, he went to California, where he died in 1850. Mr. Clarke, a clergyman of the parish of St. Leonard, near Sydney, early called attention through the press to the auriferous character of the mountains, actually found gold, and exhibited it to the local authorities, but without making any impression on the officials or the public mind. Interesting points are noticed in the following letter by this gentleman; and though some of them may be purely empirical, they deserve attention. He remarks: "I declare it to be my belief, that the axis and flanks of our Australian Cordillera are of the same geological epoch, and have undergone similar transmuting influences with the axis and flanks of the Ural; that in constituents, in changes produced by igneous action, in almost every phenomenon, and in elevation above the sea, there is a most perfect analogy in all respects in these distant chains. Again, look at the direction of the chains. It was Humboldt who first remarked that gold is a *constant* in meridian-directed mountains. The Ural, the ranges of California, and the Australian Cordillera have verified the dictum; for there is not a greater deviation in Australia from a true parallel to the meridian than there is in the Ural, which is deflected between north and north thirty-five degrees west in the northern part of its course, and between south and south forty-five degrees west in its southern expansion. There is, however, one striking

fact never before mentioned. If we look at the globe, we shall find that in the longitude of about 149 degrees or 150 degrees east, extends the middle or the meridian chain of Australia. Exactly 90 degrees from the main Australian chain occurs the auriferous Ural in 60 degrees east; and exactly 90 degrees from the same chain occur the north and south auriferous mountains of California in 120 degrees west. The fourth quadrantal meridian falls along the Atlantic between Brazil and Africa, both auriferous regions." In a despatch to earl Grey, dated March 1st, 1849, the governor-general, sir Charles Fitzroy, stated: "A specimen of gold, weighing about three ounces and a half, was lately exhibited to me. I have not been able to learn the precise locality where it was found, except that it is in the western side of the great dividing range in the Sydney or middle district." Still the home and colonial governments, with the colonists themselves, slumbered and slept.

But whatever merit is due to scientific men in the discovery of the Australian gold-fields—and they were sagacious pioneers—the practical demonstration of their existence and wealth belongs to an individual not enrolled in the ranks of science, but endowed with great natural shrewdness and energy of character. Mr. Edward Hammond Hargraves, a resident for some time in the western interior of New South Wales, soon after the disclosure of gold in California, went to that country, along with many other adventurers from Australia,

Though not a successful explorer there, he was acute enough to notice the striking resemblance between the districts yielding gold on the banks of the Sacramento, and a part of the region he had left, the neighbourhood of Bathurst, with which he was perfectly familiar. The similarity of their contour strongly impressed his mind, and suggested the idea of their auriferous correspondence, till at length he determined to return, and make experimental researches. This task seems to have commenced in January, 1851, and on the 12th of February he met with the first gold to reward his sagacity. He continued to scour the country, worked hard and galloped fast. The annexed correspondence gives the result :—

“ Sydney, 3rd April, 1851.

“ SIR,—With reference to my interview with you regarding the discoveries recently made by me of the existence of gold on crown lands in the interior of this country, and to your suggestion that I should communicate to you in writing my views on the matter, I beg leave to state that I embarked in the discovery at my own expense as a speculation, and as a means of bettering my fortunes in the event of my search proving successful. I have succeeded beyond my expectations, and so far the great hardships, expenses, and exercise of my skill have been rewarded; and, further, within the period of my explorations (the last two months) I made very satisfactory discoveries of the existence of the precious metal in several

localities on the crown lands above referred to; my first discovery was made on the 12th of February last.

"I have the honour to submit, for the early consideration of the government, the following propositions, namely:—That if it should please the government to award to me, in the first instance, the sum of five hundred pounds as a compensation, I would point out the localities to any officer or officers they may appoint, and would undertake to realize to the government my representations, and would leave it to the generosity of the government, after the importance of my discoveries and disclosures have been ascertained, to make me an additional award, commensurate with the benefit likely to accrue to the government and the country.

"Requesting the honour of an early answer, addressed to me, East Gosford, Brisbane Water,

"I have, etc.,

(Signed) "EDWARD H. HARGRAVES.

"To the Honourable the Colonial Secretary."

"Colonial Secretary's Office, Sydney,

"15th April, 1851.

"SIR,—In reply to your letter of the 3rd instant, I am directed by the governor to inform you that his excellency cannot say more at present than that the remuneration for the discovery of gold on crown lands, referred to by you, must entirely depend upon its nature and value when made known, and be left to the

liberal consideration which the government would be disposed to give it.

"I have, etc.,

(Signed) "E. DEAS THOMPSON.

"Mr. E. H. Hargraves,

"East Gosford, Brisbane Water."

"Sydney, 30th April, 1851.

"SIR,—I have the honour to acknowledge the receipt of your letter of the 15th instant, and in reply beg to say, that I am quite satisfied to leave the remuneration for my discovery of gold on crown land to the liberal consideration of the Government. The following are the localities where it exists, namely:—Lewis Ponds and Summerhill Creeks, Macquarie and Turon Rivers, in the districts of Bathurst and Wellington. I am now awaiting his excellency's pleasure as to the mode of testing the value of my discovery. Please address, care of Samuel Peak and Co., George-street.

"I have, etc.,

(Signed) "EDWARD HAMMOND HARGRAVES.

"To the Honourable the Colonial Secretary."

"Wellington Inn, Guyong, 18th May, 1851.

"SIR,—I have the honour to acknowledge the receipt of your letter, dated on the 5th instant, and in reply thereto beg to inform you that I have placed myself at the disposal of Mr. Stutchbury, and pointed out the gold country; he has expressed himself perfectly satisfied of the correctness of my statements to the government. The effect of my appearance in the

district has caused a little excitement among the people; and at this time, at the lowest estimate, I should say five hundred men are actively engaged in mining, with success; some have made very large amounts. Anticipating the government would take immediate measures to regulate the mines, I have remained here, at the suggestion of Mr. Stutchbury; and should the government require my services in carrying out their measures, I trust I shall be found (from my great experience in gold mining in California) fully equal to the task. Inferring such might be the case, I have not, either directly or indirectly, speculated in any way during the excitement, and now await his excellency's pleasure as to the amount of compensation for my discovery; and, further, if I shall be honoured with an appointment. Anxiously awaiting your reply.

"I have, etc.,

(Signed) "EDWARD HAMMOND HARGRAVES.

"The Honourable the Colonial Secretary."

The successful explorer was properly rewarded for his perseverance with a grant of five hundred pounds, appointed a commissioner of crown lands, with a salary of three hundred and fifty pounds per annum, and, at the same time, made a magistrate of the territory whose golden produce he had illustrated. Little did he imagine, on picking up the first bit of glittering metal, the extraordinary and heterogeneous crowds that would be put in motion

by the discovery. Very recently, on visiting Melbourne, he had to wander through the town in vain to find a lodging, till content with quarters at a common pot-house.

The first public announcement of the great fact to the inhabitants of Sydney was made May 2, 1851, the second day of the opening of the Great Exhibition of the world's industry at London, two events which will render the year memorable in the page of history. No sooner was it ascertained to be a well-accredited report, than every one was disposed to wonder at the general stupidity of past times, for the recollection of certain forgotten but significant circumstances immediately revived. It was known to a few that an old Scotch shepherd, named Macgregor, had been in the habit of bringing small pieces of gold to the colonial capital, which he disposed of to a jeweller. But no person could ever learn from him where he found his treasure ; and the suspicion was entertained that it was the melted-down produce of robberies. The shepherd at length disclosed the secret when it was useless keeping it any longer. He had accidentally met with the prize in the first instance, and then at intervals regularly searched the spot for it, a place called Mitchell's Creek, beyond Wellington Valley, about two hundred miles west of Sydney. It was remembered, also, that a convict labourer had been sentenced to receive fifty lashes for having a lump of gold in his possession, as it was deemed to be stolen pro-

duce similarly disguised. Then the announcements of scientific men were thought of, and no little mortification was felt, at not having adventured forth with pick and spade to turn up the soil, and explore its contents.

Proceeding to the scene of his success (May 5,) Mr. Hargraves assembled a number of the inhabitants of Bathurst, a neighbouring town, and informed them of the unappropriated wealth lying in their vicinity. He imagined the field would probably prove as rich as any of the diggings in California; and to remove all incredulity, he produced four ounces of gold, the result of three days' labour. It was subsequently found in the very streets of the place! Two beautiful samples, of an irregular oblong shape, about the size of a threepenny-piece, were found opposite the door of a stationer, near the junction of Durham and William-streets; and particles, principally of coarse gold, were scratched out of the earth with forks, pieces of stick, and even the fingers of little children, with the greatest facility, along Durham-street, from William to George-streets. A small nugget, weighing rather more than a pennyweight, was obtained by an inn-keeper from the frontage of his dwelling. Crowds of men, women, and children, might be seen carefully turning up the soil they had been accustomed carelessly to tramp over, and which had been brought into the town from the banks of the adjoining stream to repair the roads. Gold-digging may be said to have

commenced in earnest in Australia on Friday, May 9, when a small party, equipped for the work, left Bathurst, and began operations on the Summerhill Creek—one of the sites indicated by Mr. Hargraves in his report to the government. By the 13th, a piece valued at thirty pounds had been brought into the town, which created an immense sensation. On the 19th, four hundred persons were at work, occupying about a mile of the creek, many with merely a tin dish, obtaining from one to two ounces a day. On the 22nd, a proclamation was issued, declaring the right of the crown to all gold found in its natural place of deposit within the territory of New South Wales, and forbidding any person to dig without a license from the proper authorities. By the 25th, the gold-diggers had increased to a thousand, a rapidly augmenting number; and many lumps had been found, varying in weight from one ounce to four pounds.

Sydney was thrown into a state of intense excitement by the event, and a sweeping revolution took place in the plans and projects of its inhabitants. Many an eye turned wistfully in the direction of the Blue Mountains, and many a resolve was formed to wind up accounts as quickly as possible, and start for the auriferous highlands. Shops underwent a sudden metamorphosis. Articles for general purchasers were withdrawn from exhibition, and replaced with wares for the diggings—blue and red serge shirts, Californian hats, leathern belts,

mining boots, picks and pans, waterproof tents, pistols, and cradles, as if a legion of babies had been born in the city. Warehouses began to close; counters and desks to be deserted. Every imaginable mode of conveyance was put in motion for the journey, while hundreds set off on foot. Oddly and heavily-laden drays and carts, bearing crockery, tools, and stores, each with a complement of armed men, took the western road. The migration of the working classes seriously affected the employers of labour. Buildings in the course of erection were stopped. Master tradesmen, who had entered upon large contracts, were obliged to carry on their work with the cost of materials and wages doubled, or throw themselves upon the sympathy of proprietors for an extension of time. "What a curse this gold mania is!"—"How many of your men have left?"—"What rate of advance in wages have your people demanded?"—"We shall all be ruined!" These, and similar remarks, formed the staple of conversation on 'Change. It was the same in private life. The tongue had but one subject, "Are you going to the diggings?"—"Have you been?"—"Have you seen anybody from the mines?"—"Have you seen the lump of gold?"—"Have your servants run yet?"—"My coachman is off." There was no singing in one of the churches for several Sundays, the choir having vanished; and the bell at the Scots' kirk ceased to toll for want of a ringer. Unable to obtain hands, while sharing in the

common greediness for gain, employers joined the movement with the employed, descending to a common level with their men, digging and delving by their side:—

“Gold many hunted, sweat and bled for gold;
Waked all the night, and labour'd all the day.
And what was this allurements, dost thou ask?
A dust dug from the bowels of the earth,
Which, being cast into the fire, came out
A shining thing that fools admired, and called
A god.”

There were merchants and cabmen, magistrates and convicts, lawyers and their clerks, physicians and scavengers, fashionable hairdressers and tailors, cooks and coachmen, aldermen, constables, colliers, cobblers, sailors, shorthand writers, and quarrymen, cheek by jowl at the diggings, servant as good as master, all levelled by community of pursuit and costume, and scarcely to be recognised by intimate friends, owing to the general absence of ablution and abrasion. In a very brief period, a quiet, secluded gulley in a far-out cattle run, where a solitary stock-keeper, or black fellow on the hunt, were all that ever broke the silence of nature, resounded with the noise of the pick, the rocking of cradles, the washing of shingle, the barking of dogs, and the uproar of human voices. A stockman near the locality stated that, two months before, a traveller scarcely passed his house in a week, while now almost every hour brought its crowds. His children never thought there were so many people in the world, and wondered where they came from,

and what the hurly-burly of the scene could mean.

Not a few had made a sad mistake in their calculations, expecting to pick up gold like common dirt, and never considering their competency to endure hard toil, scant fare, and houseless nights, in a cheerless district, at a high elevation, and with the winter season just commencing. Jewellers and tonsors, the men of tape and ribbons, with the cits who would hesitate to walk the length of a street in a shower of rain, were soon sensible of their error. The site which had charmed in the distance repelled on a near approach, revealing the dread reality of severe labour and dirty work, slushing in mud and water by day, and lying down to be pinched with cold, or drenched with rain, by night. Numbers were therefore speedily on their way back to their deserted homes, though not with the brisk and jaunty step with which they set out, but in pitiable plight and impoverished condition, having sold their outfit for a trifle. The appearance of these cowed adventurers is graphically sketched by lieutenant-colonel Mundy:—"In my four days' journey across the Cordillera, I met, as I calculate, about three hundred men returning, disheartened and disgusted, towards the townships; many having sold, for next to nothing, the mining equipments, tents, cart, cradles, picks, spades, crows, and washing-dishes, which had probably cost them all they possessed in the world three weeks before.

They had nothing left but tin pots, 'possum rugs, and a suit of seedy clothes. A few had gold with them; 'No great things,' they said. Some had drank, or gambled away, or had been robbed of their earnings. Mortified, half-starved, and crest-fallen fellows, so able to work and so easily dispirited, were not the men for winter mining. Some looked so gaunt, savage, ragged, and reckless, that my thoughts turned involuntarily to my pistols as they drew near. They were returning to their homes and families in a state of mind by no means likely to redound to domestic peace and comfort. A good many of this ebbing stream of would-be gold-miners wore a sort of shy, embarrassed, repellant air, of which I could make nothing, until I found out that they were sore on the subject of a phrase with which it appeared they had been fretted by the villagers and upward passengers on the road—"Have you sold your cradle?" was a verbal dagger in their bosoms." But great sums were realized by persistent toil, though, from the very first, the result of steady industry was somewhat capricious. Stout, willing men, of iron frame, with excellent implements and apparatus, might slave from morn to night with only moderate success; while others, armed with a two-pronged pitchfork, a dilapidated frying-pan, or superannuated fire-shovel, hit upon more profitable ground, and met with the richest spoil. Excitement and anxiety had their victims. A shepherd finding a piece of gold on his run,

continued in vain searching for more in the neighbourhood of the spot till he went mad. Another individual, after nearly starving for two days, found five pounds' weight, fainted repeatedly, and became insane.

The colonial government acted with promptness and judgment at this crisis in providing for the preservation of public order, and the regulation of the gold-digging community. The following are the existing arrangements. All persons searching for alluvial gold are required to take out a license, the fee being at the rate of thirty shillings a month, to be paid in advance. All gold procured without this authority is liable to seizure, in whose possession soever it may be. Applicants for license are to prove that they are not absent from hired service. Claims to work unoccupied ground are marked out on the following scale:—

1. Fifteen feet frontage to either side of a river or main creek.

2. Twenty feet of the bed of a tributary to a river or main creek, extending across its whole breadth.

3. Sixty feet of the bed of a ravine or water-course.

4. Twenty feet square of table land, or river flats.

These claims are secured to parties only as they may continue to hold licenses for the same, except in case of flood or accident. The licenses are liable to be cancelled on conviction of the holders of selling spirits, or of any disor-

derly and riotous conduct. Persons holding portions of any gold-field for trading purposes pay the same fee as the diggers. When gold is discovered on lands alienated from the crown, the license-fee is divided between the proprietor, and the government. Payments may be made in the gold obtained at a fixed rate per ounce. These are the principal gold laws. In addition, government undertakes the conveyance of gold to Sydney, Melbourne, or Adelaide, under the care of an armed escort, charging the owners a per centage on the value. But little difficulty has been experienced in enforcing the regulations. New South Wales was specially fortunate in the appointment of the head commissioner to superintend their execution. It was a delicate task to control a population suddenly separated from the usual restraints of social life, thrown into entirely new circumstances, and engaged in searching for the most exciting of all substances ; and it was happily allotted to one who united forbearance with firmness, a conciliating temper with the utmost resolution.

Intelligence of what was passing in New South Wales unsettled the neighbouring colonies, drained off numbers of the labouring population, and alarmed the trading interest ; commercial stagnation and ruin being apprehended from a scarcity of hands. To check the evil, a reward of two hundred guineas was offered by the inhabitants of Melbourne, for the discovery of gold in sufficient quantities to pay for working, within the distance of one

hundred and twenty miles from the city. The existence of the precious metal in the Victoria colony was in consequence speedily recognised, and announced in a despatch from lieutenant governor Latrobe to earl Grey, dated August 25, 1851. It was found at Anderson's Creek, sixteen miles from the capital, in contact with slate-rock; at Clunes, ninety miles distant, on one of the head waters of the west Loddon River, in an alluvium of decomposed quartz; at Boninyong, the native name of a remarkable volcanic hill, seventy-five miles from Melbourne, and forty-five from Geelong; and at Ballarat, seven miles to the north of the last-named place, in the valley of the River Leigh, which became the first gold-digging locality of any consequence in the colony, owing to the surprising richness of the soil. Similar regulations to those which have been noticed were adopted by the authorities, but some difficulty was experienced in putting them in force.

The disclosure of these long-hidden treasures caused a rush of people to them beyond all comparison greater than what had been witnessed in the older colony. This was owing to the superior wealth of the sites, and their contiguity to the principal towns. Melbourne, Geelong, and their suburbs, were rapidly emptied of many classes of their male inhabitants. The streets, after presenting for a time an animating spectacle—crowded with drays laden with the outfit of adventurers, became almost silent and deserted. Day labourers in the capital and

the adjacent country, shopmen, artisans, and mechanics of every description, threw up their employment, and leaving their employers, with their own wives and families, to take care of themselves, hastened with all speed to clutch the newly discovered gold. Responsible tradesmen, farmers, clerks of every grade, functionaries of government, and not a few of the superior classes, followed the example. Some were unable to withstand the general mania, and resist the force of the stream; others were disposed to venture time and money in the speculation; and others went, because, as employers of labour, they were left in the lurch, and had no alternative. All buildings in course of erection, and contract works, public and private, came to a stand-still. Even the schools were closed. The ships in the harbour were abandoned by many of their officers, as well as by the seamen. Some vessels in the bay could not discharge their cargoes for want of hands; while others, ready to leave, could not sail for the same reason. In some of the suburbs not a man was left, and the women, for self-protection, grouped together to keep house; shops were shut, having either no assistants to conduct business, or no purchasers to deal with. The governor had to groom his own horse, and all the respectables to perform menial work. Provisions rose to a high price, for though there was an abundant supply within reach, sufficient hands could not be found to turn it to account. As the summer set in, the

current of life flowed back again to the towns, owing to the natural water-courses drying up, and suspending all washing of the soil for gold.

Laborious excavation and careful washing of the soil are the main operations at the gold-fields. The principle on which the latter process depends can readily be made plain to all, however unaccustomed to metallurgic operations. If a quantity of shot, earth, and sand be intermingled, and then shaken in a vessel with water, it is evident that the shot will gradually find its way to the bottom, because of the greater specific gravity of the metal. Or if the compound mixture is exposed to the action of a running stream, the lighter particles will first be borne away, leaving the heavier behind. This principle is practically applied to auriferous soil in all gold-washing operations, however much the apparatus employed may vary in shape and size. Upon arriving at a point where the quality of the ground has been tested and found payable, if all the claims have been taken up, the party has to "prospect," as it is called, in search of a similar location. A pick, spade, and prospecting-pan, are the implements required. The pan is merely a large, round, flat-bottomed, and shallow tin dish, into which a sample of earth is thrown. This is carried to a stream, dipped in the water, and well shaken, till the particles of gold, if there be any, have descended by their own weight through the upper layer of earth. By inclining the dish, the water flows off, carrying along with

it the upper portion of the earth. The process of dipping and agitating the remaining soil is then repeated, until the earth is all carried away, leaving behind whatever gold there may be. If the result is satisfactory, the gold-hunters take out a license, have a specific space allotted them, pitch their tent, fix their cradle, and commence digging and washing in earnest.

The "Californy cradle," in diggers' parlance, is a rude rocking machine, resembling its namesake for babies, but standing higher for the convenience of the workmen. It may be described as a long wooden box, or trough, slightly inclining from the head to the foot, having small bars fastened across the bottom from side to side, in order to arrest all the gold which may be intermixed with the earth thrown into it. At the end there is a hole to allow the water and light soil to run off; and at the head there is a raised coarse wire grating, upon which the earth is placed, with a handle to rock the machine. Having fixed the cradle at the side of a stream, three men are usually employed in its management. One throws the earth upon the grating or sieve, which keeps the coarse stones from passing through; another pours water upon it from the stream; and a third gives a violent rocking motion to the instrument. The agitation gradually detaches the earthy and gravelly matter from the gold, which falls to the bottom, and is arrested at the bars, while the lighter particles of soil flow away with the water. After a time, the

sieve is examined for nuggets, and the stones are thrown away, while the residuum of gold at the bottom of the cradle is carefully collected. Frequently there is none at all, often only a few grains, but sometimes several ounces may be taken out. The same process is then repeated. When the soil to be washed is a stiff clay, it is first puddled, or cut up in a tub with water, and churned about with a spade, before being subjected to the cradling process.

Washing for gold is commonly performed in Australia in a very rude and wasteful manner. In many instances it has been found profitable to work over again the refuse earth from the cradle. Even when carefully and skilfully conducted, only those particles of metal which are large enough to be visible to the naked eye are collected, a portion in a minute state of subdivision being carried off by the water. Hence, in some countries, it is the practice of gold-washers to cause the mud and slime, as they pass from the lower end of the cradle, to run over rough cloths, the wool of sheepskins, and other materials of like character, by which contrivances a considerable amount of valuable deposit may be saved. But the finest auriferous particles may best be gathered up by means of quicksilver, which has the property of seizing upon gold the more rapidly in proportion as it is minutely divided, and forming with it a pasty mass, or amalgam. The auriferous sands of the Ural Mountains, after being washed, are subjected to the process of amal-

gamation as the final operation. The two metals in the amalgam cling most closely to each other, but are readily separated by subjecting the mass to the action of a moderately strong heat, in an apparatus properly constructed for the purpose. The quicksilver passes off in the form of vapour, and leaves the pure gold behind. Amalgamating machines may be bought at no great cost in the Australian market ; and those who cannot reduce their own amalgam may sell it in the crude state, generally at about three-fourths of the price of gold dust. There can be little doubt that a large amount of the refuse thrown aside by the cradleman would yield a profitable result to scientific treatment. In prospecting, also, the ordinary mode of testing the soil affords no certain proof of its quality. It may be impregnated with finely comminuted gold, which escapes observation, whereas every particle will disclose itself by kneading up the earth with mercury.

It is desirable for hunters and buyers of gold to be acquainted with its mineralogical and other characteristics, and the modes of distinguishing it from substances of similar appearance. Serious mistakes have often been made by the ignorant, and heavy losses incurred, through the fraudulent imposition of a comparatively worthless substitute. Gold in its native state always exhibits a tinge of its well-known yellow colour when pure. But there are various intensities of this colour, depending on

the metals with which it may be mixed. Sometimes the hue approaches to a silver-white, like mica, and to a steel-grey, like platinum. Gold has also a highly metallic and shining lustre, which it preserves after long exposure to other substances, owing to its non-oxidable qualities. In auriferous sands, the shining particles are often discernible, even when the quantity of the metal is not sufficient to render its abstraction profitable. In case the surface is dull, the true appearance may be readily restored by a little rubbing, and a high lustre be given, which will remain long untarnished, as gold is not easily rusted, or acted upon by the oxygen of the atmosphere.

All is not gold that glitters. Scales of mica strongly resemble the precious metal in colour and shining lustre, and have frequently been mistaken for it. At a recent date, the captain of one of the guano vessels found a substance which he believed to be gold. It was, of course, carefully collected, put into bags, and added to the freight of the vessel. On arriving at port, two dealers in gold dust went on board, one of whom cautiously took away a sample to have it assayed, and speedily detected the nature of the stock. The other, eager to anticipate a rival, returned at night, and purchased the entire cargo, which he afterwards discovered contained not a particle of gold. It was only mica. Gold may be easily distinguished from mica by simple experiments with a pair of scales, or by washing with water, being extremely heavy,

while mica is light. Hence the metal will always fall first to the bottom, if shaken in water with mud, while mica will generally be the last material to sink. This will be the case, however fine or few the particles of either mineral may be.

Two common products—iron and copper pyrites—have a striking resemblance to gold ; but the precious is readily discriminated from the useful metals. No individual, in possession of a common knife and hammer, ever need make a mistake. Gold is softer than steel, and may therefore be scratched with a knife, whereas iron pyrites, being harder than steel, a knife will fail to scratch it. In the case of copper pyrites and gold, both receive impression from steel, but a hammer will decide between the two. Gold is malleable, and may be beaten out into thin plates, whereas copper pyrites, struck with a hammer or a stone, immediately begin to crumble. The manufacture of counterfeit gold dust, as the produce of California, has been carried on to a great extent. Large quantities have also been produced in Birmingham and sent to Australia, to be sold there as the virgin yield of Ballarat or Mount Alexander. Losses of great amount have been experienced by unwary parties, through this fraudulent device. It is desirable, therefore, to be acquainted with ready modes of detecting adulterated gold dust, or articles altogether spurious ; the following is a simple method, by nitric acid. Place a portion of the dust in

an earthenware saucer, and pour the acid upon it. Then hold the saucer over the flame of a candle, or a few cinders, until red flames, nitric vapours, arise. If the gold is pure, the liquid will not become discoloured, owing to the acid having no action upon the metal. But if pyrites or brass filings have been mixed with it, the liquid will become turbid, green, and black, discharging bubbles of gas.

Since the first discoveries were made, numerous localities have been opened, in both the colonies of New South Wales and Victoria; and, attracted by the golden bait, immense numbers from without have poured into them, especially into the latter district, owing to the wealth of its fields, and a more proximate position to the countries in maritime connexion with Australia. Our newspapers have daily teemed with advertisements relative to shipping bound for the southern hemisphere, and to effects needful to be taken out by emigrants; tents, mattresses, boots, gold-working implements, pistols, guns, and rifles. The number of new occupants of the soil since its auriferous nature was disclosed, it is impossible to state, but the estimate of five thousand per week has been mentioned, amounting to upwards of a quarter of a million per annum, the great majority of whom have been landed at Melbourne. The emigrants form as motley a group as ever was collected, consisting of absconded convicts and ticket-of-leave men from Tasmania, the perpetrators of murder and outrage; South Sea

islanders, Chinese, Californians, regular-bred Americans, Germans, English, Irish, and Scotch. Property in the capital has immensely increased in value, owing to the influx, and the consequent demand for house accommodation. Building allotments have been sold in some instances for sums which could not be obtained for plots of equal size in the very centre of London or New York. Fortunes have been realized in this way by persons who never could have dreamed that their property would ever rise to one-tenth of the value they now receive for it. Ground fronting a principal street has been sold at £250 a foot frontage; and houses have in some cases let for a yearly rental larger than the whole amount expended in erecting them a few years ago. On account of the high price of labour, it has been absolutely impracticable to provide tenements of the humblest description for the increased population, as it cannot be expected that artisans will accept the ordinary rates of wages, when they can calculate upon earning an ounce of gold a week at the diggings, besides being their own masters. Overcrowding and houselessness are therefore painful physical necessities, and the evil is aggravated by the total absence of sanitary regulations. It is no strange thing to see twenty stalwart men stretched upon the floor of a close, confined, unventilated room, night after night, paying from eighteenpence to half-a-crown for the wretched accommodation. "I have been," says one, "in many places, and

have seen the overcrowded lodging-houses in almost all the emigrating ports of Great Britain, but all that I have ever beheld in that way fall short of a tithe of what I have seen since I came to Melbourne ; and yet the cry is, still they come, 'not in single files, but in battalions.'" Many thousands are necessarily tented, forming an immense encampment on the banks of the Yarra-Yarra.

Society is of course in a strangely anomalous condition, and has its painful and revolting, as well as its surprising features. Personal independence in speech and act, self-assertion, and scorn of conventional distinctions, rapidly become distinctive characteristics. All ranks having been associated in a common hunt for gold—grubbing it out of the same dirty holes—every barrier has been broken down. Gentlemen as a class are utterly extinguished. Successful diggers are lords of the ascendant, constituting for the present the aristocracy of the colonies. Time will rectify much of what is at present incongruous in Australian society, but its permanent character will probably bear a far greater resemblance to the Anglo-American type than to the English model.

While many turn the spoil extracted from the gold-fields to good account, the old adage, "easy comes, easy goes," is largely exemplified by others. The produce is rapidly wasted by no inconsiderable number of the diggers, on their visits to the towns, in freaks, vagaries, senseless extravagance, and disgusting excesses.

Champagne at a guinea or thirty shillings a bottle; the best of everything in the shape of food; and the costliest dresses for their newly married wives, soon diminish or altogether exhaust the store of many a digger, the thought of speedily replacing the sum in another campaign acting as a stimulus to their squandering. Exhibitions in the way of costume are occasionally ludicrous in the extreme;—stockingless ladies with princely shawls upon their shoulders—the coarsest forms adorned with delicate laces—hands and face not in the cleanest condition, associated with silks and satins. Gay colours and high prices being the test of worth to the purchaser; shopkeepers have realized enormous gains in disposing of common but gaudy articles. Scorning to spend copper, small change is refused by the man of gold, till traders have taken the hint not to give it to any of their customers. Some will throw down a cigar with the remark, “You must take that for change, as we have no time to attend to small money.” A Scotchman relates, having landed with neither more nor less than a solitary sixpence. “I called,” says he, “for a glass of ale, and stood waiting for change.” “You are a stranger, I suppose?” “Yes, ma’am! Was I not wishing myself back again?” Prodigality, intemperance, and gambling have been engrafted upon successful gold-diggers to a lamentable extent, while other exhibitions of its effects are scarcely less revolting, though of an opposite nature. Many

have been observed to become apparently changed men after their first acquisition. They grow suspicious to excess, view every one with distrust, and even well-known friends are watched closely, as if intent on robbery. They shun companionship except with those of their party who have an equal interest in the treasure, and become silent and meditative. All the better feelings of their nature are subordinated to the love of lucre. They have but one object in view, one idea—the acquisition of gold—the easiest and best method of obtaining it, and of preserving the store in safety; for which the deadly pistol is ever kept at hand, ready to be pointed at the breast of any doubtful visitor. This is the ruling passion, and under its influence, social feelings wither, and the humanities of life are extinguished.

In all ages and countries, the search for gold has called the worst passions of human nature into frightful activity, and led to the perpetration of some of the blackest crimes which deform the pages of history. Australia has also sufficient even of those who prefer stolen lucre to the gains of their own toil, and, with truly callous wickedness, prey upon society. Recent accounts mention bushrangers, infesting the roads in gangs, stopping passengers and tying them to trees to prevent the alarm being given, after having stripped them naked, and spoiling them of their property. It may be expected, however, that the presence of law, with the influence of the well-disposed, will

speedily rectify existing evils; and that the disclosure of golden treasure will eventually prove to be another link added to the chain of human progress—a balance of good resulting from the attraction of a population to the waste places of the globe.

Meanwhile, intending emigrants will do well seriously to ponder the various facts now brought under their notice, before committing themselves to any steps which cannot be re-traced. To such of our readers, however, as have determined to brave the perils and difficulties that lie before them, one parting recommendation may be addressed. Amidst their various preparations, let them not forget to carry with them one book—the Bible. “Let them prize it as their best treasure, adapted to strengthen their minds under difficulty, soothe them in sorrow, and guide their footsteps from the uttermost parts of the earth to a better country than the land of their birth, or that of their adoption. Let them search it with earnest prayer for the enlightening influences of the Holy Spirit. Reconciled to God through faith in the Son of his love, and taking up the light and easy yoke of Christ, they will in all their wanderings have a Friend and Father to sustain, console, and support them.”

